TECHNOLOGY DEPT.

FLIGHT

MAGAZINE

MAY 1956
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BEECHCRAFT G35 BONANZA

THE DE HAVILLAND UC-1 OTTER

In Service with the United States Navy in the Antarctic

The UC-1 Otter is adaptable for
use with wheels, floats, or skis.

Designed and built by

THE DE HAVILLAND AIRCRAFT OF CANADA, LIMITED

Postal Station "L", Toronto, Ontario

2-56

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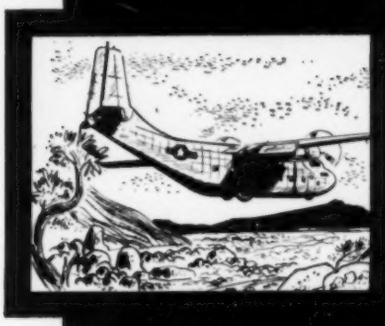
BIG PERFORMANCE
ARE BUILT INTO
FAIRCHILD C-123



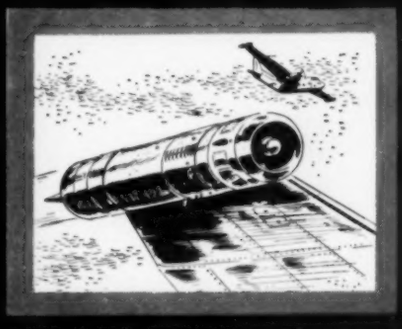
Lands or takes off in less than 10 times its own length. The Fairchild C-123 operates on any terrain with only 600 feet of field space.

Maximum load-carrying capacity and workhorse durability are just two of the many reasons why the Fairchild C-123 Assault Transport is ideally suited to tough jobs in all combat airlift operations.

Equipped with Fairchild J44 turbojets on each wing-tip, the C-123 is provided with a power package of 2,000 lbs. extra thrust to meet any critical take-off or flight requirement.

In front line operations, on any terrain, under the most difficult conditions, the Fairchild C-123 gives *big load, big lift,* and *big performance* where and when utility and logistics support is needed.

A Division of Fairchild Engine and Airplane Corporation.



Fairchild J44 turbojet engines give added power thrust to the C-123, providing an extra margin of safety for any emergency condition.

FAIRCHILD

AIRCRAFT DIVISION • HAGERSTOWN, MARYLAND

...WHERE THE FUTURE IS MEASURED IN LIGHT-YEARS!

Loading ramp is built in. Up to 19,000 pounds of bulk cargo can be driven right into the fuselage, eliminating ground handling equipment.

Phillips 66
PRESENTS

MILESTONES IN AVIATION

Flying LST

In 1914, U. S. Navy flying boats landed at Vera Cruz, and a camp was established on the beach—the Navy's first beachhead landing.

Our Navy now has a "flying LST" capable of patrolling the Seven Seas. In a matter of hours, instead of days or weeks, its new R3Y-2 *Tradewind*—a giant, high-speed seaplane transport—can fly to distant combat areas. It can land and taxi right up to the shore during amphibious assaults. The R3Y-2 can swing up its nose door, slide out its bow-loader ramp and discharge troops, heavy equipment, weapons and supplies right on the beach.

The *Tradewind* is the first U. S. multi-turboprop airplane. It attains a speed of nearly 400 miles per hour. It is 139 feet, 8 inches long, and its wing span measures 145 feet, 9 inches. Fully loaded, it weighs 82 tons. With the *Tradewind*, our Navy achieves another "Milestone in Aviation."

It's Performance that Counts!

Phillips Petroleum Company's performance in research for the development of more powerful, more efficient aviation fuels has resulted in many of the important discoveries that have made possible the production of high octane gasoline on a truly colossal scale.

Phillips is now producing enormous quantities of 115/145 grade aviation gasoline for military and commercial use. Phillips also supplies improved fuels for the latest designs in turboprops and jets.

In aircraft fuels, it's *performance* that counts. And Phillips *66* products are *outstanding* for performance!

AVIATION DIVISION
PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA

Phillips 66

AVIATION PRODUCTS

SOUTHWEST AERO COMMANDER DISTRIBUTORS attended a factory sales meeting held in Dallas last month. Left to right in the group at left above are Joe Frost and Bob Brown of Commander Sales, San Antonio; Norman Hoffman of West Texas Flying Service, Midland; John Brown of Brown Aero, Dallas; Factory Sales Manager Carl Wootten; Lucien Taillac of Trans-Aire, New Orleans, and Ray Wilson of Downtown Airpark, Oklahoma City. Newest Commander distributor is Brown Aero Corp., Love Field, Dallas. In picture at right, left to right, are its executives, Bill White, general manager; John Brown, president, and Zeke Evans, sales manager. Brown is of the Brown Paper Mill interests of Monroe, Louisiana, and is a graduate aeronautical engineer.
—(FLIGHT MAGAZINE Photos by Tom W. Collins.)

AIR Report
Significant Trends and News

U. S. PRODUCTION OF THE FOKKER F-27 TURBOPROP as a DC-3 replacement for local service airlines is said to be assured, with Fairchild producing the Dutch design in Baltimore. Latest feeder to buy the 280-mph. high-wing transport is Frontier Airlines of Denver, which ordered 6 F-27's. Fairchild has added to its customer relations staff J. F. (Skeets) Coleman, noted test pilot and first to fly a vertical take-off airplane, the Convair Pogo. Coleman's efforts will be devoted to sales and promotion work connected with the F-27. The company also plans a jet business transport.

U. S. SALES OF THE 4-ENGINE DE HAVILLAND EXECUTIVE HERON as a business transport will be pushed by de Havilland. Latest development is the addition of two more Herons to the "queen's flight" in England, replacing three Vikings. Her Majesty's flight now consists of 3 Herons, one having been used for two years. Thus the Heron, widely used by small airlines in England and other areas, has become a trusted vehicle for royalty in its executive version.

TEN MILES PER HOUR ADDED SPEED, range increased to 745 miles and a new interior feature the new 1956 version of the Helio Courier, 4-place executive-utility lightplane equipped high-lift devices. Lynn L. Bollinger, president of Helio Aircraft Corp., Norwood, Mass., said 28 Couriers have been delivered since production was begun last August at Pittsburg, Kansas, by Mid-States Manufacturing Co. The spin-proof, stall-proof Courier, powered by a 260-hp. Lycoming engine, now cruises 167

FLIGHT MAGAZINE

MAY, 1956 VOL. 45, No. 5

COVER: This month's portrait of a business plane is a new flight photo of the Beechcraft G35 Bonanza by Jim Yarnell. Fastest 4-place on the market, the G35 has an advertised cruising speed of 184 mph. using only 65 per cent of power from its 6-cylinder 225-hp. Continental E-225-8 engine.
—(Beech Photo.)

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager; E. H. PICKERING, Consultant; P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas—Telephone TEnison 6191.

FLIGHT MAGAZINE, May, 1956, Vol. 45, No. 5. Published Monthly. Publication office, P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas. Price 35c single copy. Subscription rates: United States, one year, $3.00; two years, $4.00; three years, $5.00. Established February, 1934. Entered as second-class matter at the Post Office, Dallas, under the act of March 3, 1879.

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OKLAHOMA CITY SEPT. 1-2-3

America's Major Aviation Show for All of the Armed Services

In keeping with its plan of rotation, the U. S. Department of Defense has designated Oklahoma City the site of this year's aviation classic—the National Aircraft Show.

Here, for the first time in the southwest, the aviation industry in cooperation with the Armed Services will dramatically report to the nation the progress of our air power.

It is the only major show for 1956 approved by the U. S. Department of Defense and sanctioned by the National Aeronautic Association. It will carry full participation by all branches of the Armed Services, both in flying demonstrations and static exhibits of aircraft and equipment.

Spacious hangars for indoor displays and vast outdoor exhibit areas offer airframe, engine and component parts manufacturers a singular opportunity to effectively present their latest developments to all the Services, the industry and public . . . for this is aviation's traditional annual rendezvous. It merits your serious consideration and active participation.

For floor plan diagrams, exhibit space contracts, ticket information and complete details write—Benjamin T. Franklin, General Manager, NATIONAL AIRCRAFT SHOW, 400 UNION COMMERCE BLDG., CLEVELAND 14, OHIO

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AIR FOUNDATION AND OKLAHOMA CITY CHAMBER OF COMMERCE

SANCTIONED BY NATIONAL AERONAUTIC ASSOCIATION

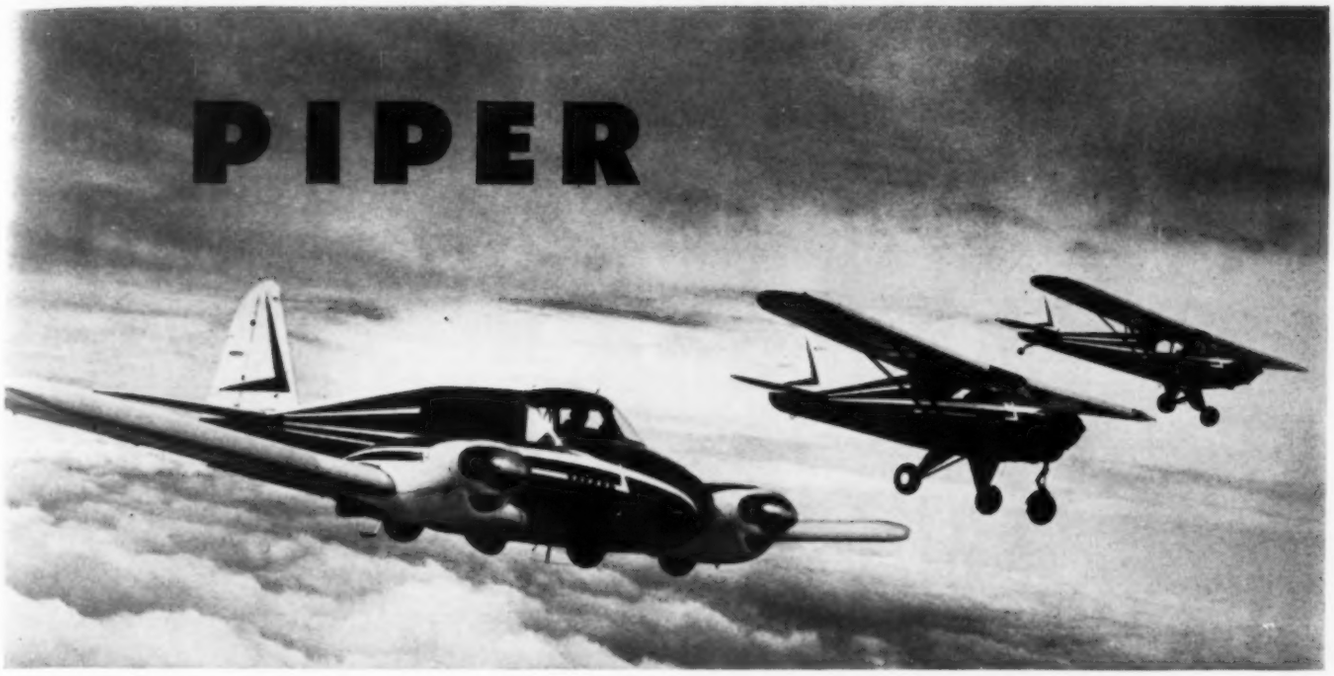
mph. on 70% of power at 8,500 f , and 157 mph. on 60% horsepower. It can fly under 30 mph. with full co trol, Bollinger says. It is guarante d to take off and land fully loaded in 5 yards under zero wind conditions.

FRED L. ROSCOE, formerly eas ern divisional sales manager, has be n promoted to domestic sales manag r of Cessna Aircraft Company, accor ing to Frank Martin, whose new tit is marketing manager, commerci aircraft. Roscoe has in turn mov d Eldon Boyd from the central divisio to be western sales manager; Bill Norris from the southwest to be east ern sales manager, and William Fergusson has been named divisiona sales manager for the twin-engin Model 310.

TIGHT-MONEY CONDITIONS restricting bank financing are complicating dealer arrangements for high-cost demonstrator business planes, especially in cases where factory requirements demand several demonstrators per outlet.

NEW BUSINESS FOR BEECH AIRCRAFT CORPORATION announced last month includes: Six L-23 U. S. Army D50 Twin-Bonanzas for command use, costing about $500,000; a $7.5 million Air Force order for huge, 1,700-gal. jettisonable fuel tanks for B-47 bombers; a $5 million order for Beech MA-3 ground starters for jet planes; a $4 million order for Navy T-34B Mentor trainers; and development of a new supersonic "Dart" tow-target being considered by Air Force, Army and Navy. On April 13, Beech declared a 30-cent

LEE RENSHAW JOINS NEW CESSNA DISTRIBUTOR at Oakland, California, resigning from Cessna Aircraft as western representative to be vice president of California Aviation Service, Inc. The firm is headed by Henry von Berg (left), shown with Renshaw. Von Berg recently bought the assets of R. P. Bowman, former Cessna distributor at Oakland. Von Berg learned to fly in World War I, became Cessna's first distributor in 1935 when he bought Dwane Wallace's first production airplane, a C-34 Airmaster. His school trained thousands of pilots at Stockton, Calif., and Carson City, Nevada, during World War II.



SAFE, ECONOMICAL, CONVENIENT . . .

PRACTICAL

Practical — that's the final fact that sells the businessman on the advantages of using a business airplane. Every day this *practicality* is proven a thousand different ways by tens of thousands of business airplanes . . . saving time, saving money, building business.

Piper has been building *practical* airplanes for over 25 years — consistently selling more civil aircraft for business and farm than any other manufacturer.

There's a reason — Piper airplanes provide safe, economical, convenient, *practical* transportation. And there's a Piper model to meet nearly every general business, industrial or agricultural requirement. For information see your Piper dealer or write today.

PIPER . . . builds a practical plane for every purpose

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for the businessman

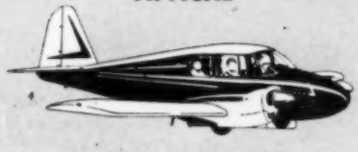
Combines more features to simplify flying than any other plane available today . . . tricycle landing gear, simplified controls, single hand brake, many other exclusive features. Carries four passengers, cruises over 130 mph with up to 700-mile range. More powerful, faster, far less expensive than any other similar type plane. Only $7295 for Standard 150 hp Tri-Pacer.

SUPER CUB

for general utility

Takes off, lands in less than 50 yards. Widely used to fly where other planes can't — survey, patrol, Alpine rescue, uranium prospecting. A favorite for farm and ranch. Holds world's piston-powered lightplane altitude record of 30,203 feet. Model PA-18-A agricultural version is most widely purchased duster, sprayer. 150 or 90 hp . . . from $4795.

APACHE



executive transport

A superbly luxurious 4 to 5 place twin-engine transport for round-the-clock operations. Cruises 170 mph with range up to 1200 miles. Has excellent performance on only one engine. All-metal. Priced $21,000 less than any other new twin-engine airplane available. In use by many leading corporations. Completely equipped except for radio . . . $34,000.

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EXTRA PERFORMANCE

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AND PRIVATE FLYING
THE ADVANTAGES
THAT HAVE
MADE ACs
OUTSTANDING
IN MILITARY
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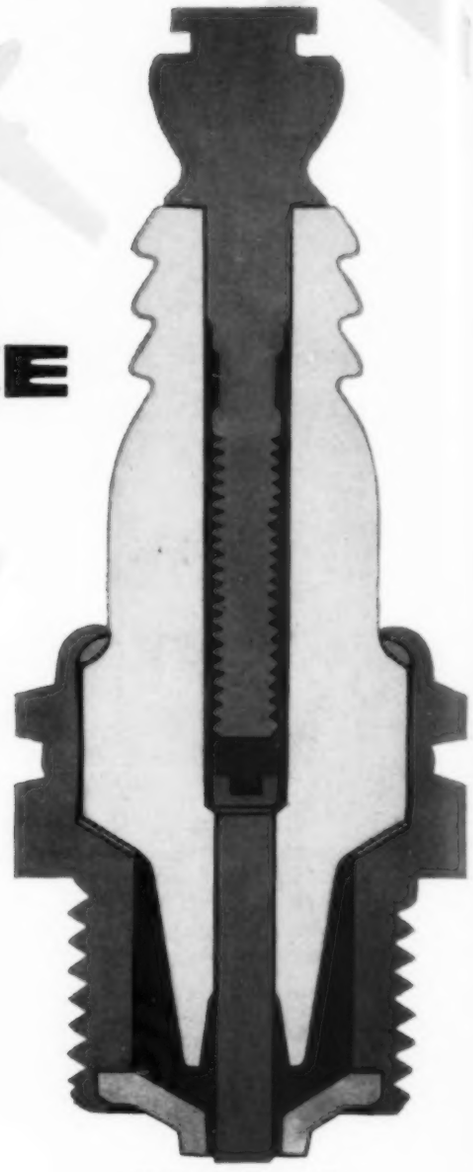

AC short-reach plugs: A-88, S-88, HSR-86, S-86R, SR-83 P, HSR-83 P, LA 47,SA 43, A44

Now, pilots of executive aircraft and private fliers, too, can enjoy benefits which AC engineers pioneered, tested and proved in millions of hours of flight in military and airline planes.

Two AC *exclusive* features are now available for the first time in *any* short-reach plugs . . . and they are the reason why you can expect extra performance and extra life from AC short-reach spark plugs.

These are the AC features that mean extra performance and longer life!—(1) Conductaseal for a positive "no-leak" center seal, (2) leakproof heat-sealed shell construction.

With these new short-reach plug types, the AC line now provides spark plugs for practically every plane that flies. When you ask for ACTION, ask for AC!

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The New 680 Aero Commander

WITH LEAR ABUNDANTLY DESIGNED INTO IT

When the high-performance Model 680 "Super" Aero Commander was at the design stage, specific structural and space provisions were made for Lear equipment – complete Lear L-2 autopilot system with automatic altitude control and automatic approach coupler – Lear LVTR-36 VHF crystal-controlled 36-channel transceiver–Lear Model 2200 marker beacon receiver – Lear ADF-14C automatic direction finder – Lear LTRA-6 VHF transceiver system with omni – Lear broadband VHF antenna. All these units have been installed in company demonstrators, and Aero Design and Engineering Co. officially offers this complement of Lear equipment.

Take a tip from the builders of the great new 680 "Super"... specify Lear!

LC-30

LEAR LEARCAL DIVISION, 3171 S. BUNDY DR., SANTA MONICA, CALIFORNIA

To be a leader in any chosen field, something must set you apart from the average . . something that stands out regardless of competition.

We are a leader in Aviation Insurance. We attribute our leadership to our knowledge and many years of actual experience in aviation. We grew up with the Aviation Industry and are thoroughly familiar with the insurance needs of aircraft owners and operators.

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Don Orbaugh, Elwood, Indiana Phone FEderal 2-6142

Glenn Tabor, 3028 Clark Court, Topeka, Kansas, Phone 3-7493.

Van's Air Serv., P. O. Box No. 31, Winona, Minnesota, Phone 9100.

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dividend and reported six-month sales of $36.8 million with a profit, after taxes, of $1,223,102. The firm's backlog at that date stood at $83.9 million.

CESSNA AIRCRAFT COMPANY last month raised its dividend rate from 25 cents to 35 cents per share, boosting its annual dividend rate from $1 to $1.40 per share, on the basis of $33.3 million in sales for the first six months of its fiscal year, a 45 per cent jump from the first half of 1955.

CAA HAS ISSUED AN APPROVED TYPE CERTIFICATE to the Fairchild J44 turbo-jet engine, which produces 1,000 lbs. of thrust and weighs 330 to 370 lbs. in two versions.

THE AIRCRAFT YEAR BOOK FOR 1955, official publication of the Aircraft Industries Association edited by Fred Hamlin and Eleanor Thayer Miller, is now available at $6 per copy from Lincoln Press, Inc., 1143 National Press Building, Washington 4, D. C.

COMPLETE BENDIX COMMUNICATION AND NAVIGATION EQUIPMENT has been specified by National Distillers for the Super Ventura it has ordered from Howard Aero, San Antonio.

NEW AERO COMMANDER SERVICE MANAGER for Dallas Aero Service is Homer J. Penwell, formerly with the Aero Commander factory and recently service manager for Fairfax Aviation in Kansas City. He heads a new Aero Commander Division established by Dallas Aero Serv-

TALL ROTORS ON TOTEM POLES are the "new look" for Bell Aircraft's experimental U. S. Army convertiplane, pictured as it resumed flight tests last month after modifications lengthening the rotor masts. Full conversion in flight will be conducted soon as the project gathers momentum. Rotors tilt forward for transition from helicopter to airplane flight. They are shaft-driven from a 450-hp. engine in the fuselage. Ailerons appear to be removed in these photos.
—(Bell Aircraft Photo.)

For FLIGHT TESTED Fuels and Lubricants . . . stop under the Humble sign

Humble top-quality aviation fuels and lubricants are produced by the most modern of refining procedures, and they are flight-tested to insure dependable performance in your plane.

Produced from selected crude oils, Humble aviation oils are carefully refined to give you long life of engine parts, more engine cleanliness, freedom from ring-sticking and high viscosity index for easy starting and low consumption. Humble aviation fuels are balanced for optimum power and performance.

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Complete Beechcraft Bonanza ACCESSORIES are available at Aircraftsmen Inc. . . . map and thermos cases, curtains, visors, breather oil separators, aileron trim controls, and ten-gallon auxiliary fuel tanks . . . installed by FACTORY-TRAINED, experienced technicians.

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ice at Love Field to provide factory-authorized Commander service, overhaul, maintenance and modifications.

SURPLUS SALE OF 220 CARGO AND TRAINER AIRCRAFT within the next several months will include C-45, T-11 and T-7 aircraft manufactured between 1941-1944. Bids on the first of three sales will be opened May 14 at Hill Air Force Base, Utah.

NEW MEDIUM-RANGE JET AIRLINERS are being developed by Convair and Douglas, with TWA considered a customer for the Convair.

WILLIAM R. STOUT, 76-year-old aviation pioneer and builder of the Ford Tri-Motor, died recently at his home in Phoenix.

ONE OF THE FIRST shrouded tanks for the rear fuselage of executive Douglas A-26 aircraft was manufactured and installed recently by Aero Corporation, Atlanta, for Chief Pilot Arnold Falk of Superior Oil Company, of Houston in his A-26B.

LOCKHEED HAS ISSUED CONTRACTS FOR F-104A COMPONENTS to Beech Aircraft (aft fuselage), Goodyear Aircraft (nose section), Temco Aircraft (complete wing) and Rheem Manufacturing (entire tail assembly).

Airmen's Calendar

May 11—Pacific Airmotive—P&W Engine Forum, Seattle.

May 11-13—Texas Private Fliers Association Annual Convention, Statler Hilton Hotel, Dallas.

May 13-23—7th Annual All-Woman International Air Race, Hamilton, Ontario, to Havana, Cuba. Entries: Irma Price, Entry Chief, 242 S.W. 8th St., Miami, Fla.

May 15—Pacific Airmotive—P&W Engine Forum, Oakland.

May 17—Pacific Airmotive—P&W Engine Forum, Burbank.

May 22—Pacific Airmotive—P&W Engine Forum, Denver.

May 25—Northwestern Aeronautical Co.—P&W Engine Forum, St. Paul.

May 27-June 3—Aviation Writers Association Annual Convention, Mark Hopkins Hotel, San Francisco.

June 2—7th Annual Reading Air Service Maintenance and Operations Meeting, Reading, Pa.

June 4-10—Flight of the Flamingos Fly-In, Las Vegas, Nev.

June 5-6—Assembly of Radio Technical Commission for Aeronautics Spring Meeting, Hotel Statler, Boston.

June 8-10—Missouri Air Tour.

June 10—Quad City Airman's Association Annual Fly-In, Moline, Illinois.

June 11—Flying Physicians Association's Annual Meeting, Palmer House, Chicago.

June 13—Atlantic Aviation-Airwork Corp.—B. F. Goodrich Technical Forum, Teterboro.

July 30-Aug. 2—National Flying Clubs Convention, New Washington Hotel, Seattle.

July 31-Aug. 9—23rd Annual U. S. Soaring Contests, Grand Prairie Airport, Grand Prairie, Texas.

announcing . . . for airline and executive aircraft use

THE *Sapphire* 1016

90-360 CHANNEL VHF TRANSMITTER

90-560 CHANNEL VHF RECEIVER

Complete unit occupies ½ ATR rack, weighs 24¾ pounds. Unitized construction permits quick separation of transmitter, receiver and power supply units for easy servicing.

Narco introduced its airline-quality Sapphire line of navigation and communications equipment with the Narco DME...Now comes the Sapphire 1016 VHF communications unit designed to meet the maximum channel requirements for airline and executive aircraft use.

The Sapphire 1016 includes a high-powered transmitter of 90 to 360 channel capacity. It has a crystal-controlled receiver of 90 to 560 channel capacity with precisely defined 50 kc channel separation available throughout the entire range from 108 to 135.95 megacycles.

The Sapphire 1016 meets latest CAA TSO requirements for airline use. While its performance and channel capacity match the finest airline-type equipment available, the 1016 is offered at only a fraction of the cost of comparable equipment. See your Narco dealer or write for full details.

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AMBLER, PENNA.

a letter from Daddy

TO: BOBBIE PHARES

Dear Bobbie:

Okay, okay—I'll relax! I guess you're safe alright, workin' in that Missionary School, teachin' them naked little cannibals how to sing civilized songs and wear britches. If I ever hear of you pokin' your nose into that African jungle, I'm gonna aim my trusty DC-3 toward Kilimanjaro and get you back to Dallas. Your 25 years, 5'4", 112 lbs., blue eyes and black hair would make quite a tidbit for one of them outsize primeval varmints!

You're a sweet and gentle girl and I'm pleased you're devoted to The Better Things. I'm also for Better Things, with the Very Best coming from Southwest Airmotive, the business pilot's Friend for 24 years.

SAC's now opening its great new Aircraft Shop, with eye-popping changes in all directions. Here's the traditional home of Quality inspections, overhaul, electrical and prop work, and modification.

The same's true of Southwest's famous Engine Division which, while also overhauling USAF jets, has added more tooling and talent to its piston engine and accessory departments. Private owners find it bigger and better than ever.

This is the Growin'est, and the Goin'est spot in the industry. Why don't you hop over for a weekend—in the Air Age you're really not Safari far away!

Love, *Daddy*

SOUTHWEST AIRMOTIVE CO. • LOVE FIELD • DALLAS, TEXAS

Just among ourselves

For All the People

CONGRATULATIONS are in order to the management of the National Aircraft Show, the military air services and the good folks of Oklahoma City for locating the 1956 show next Labor Day weekend in the great Middle West. Heretofore this annual flying and static display has been an eastern monopoly. It's high time some of the western and middle western taxpayers get the opportunity to see where their money is going.

While on the subject of the National Aircraft Show we might as well put in our oar on some other aspects of the affair that need attention. First of all, we think military domination of the events and displays has sorely hurt the show. We would not propose cutting out this participation but it wouldn't take much money, effort or imagination to pull in more civil aviation participation.

The wild blue yonder stuff is fine but a sensible mixture of the kind of aviation now within the grasp and utilization of Mr. Average American certainly is in order. Business, industrial, agricultural and transport aviation should account for at least half the flying and static displays. It would provide a splendid show window for the booming U. S. commercial aviation industry, especially if national television coverage is adequately employed.

There's also another opportunity for broadening both general aviation and youth interest in the National Show. Not long ago a group of original "backyard" airplane designers and builders banded together in what is known as the Experimental Aircraft Association. If we can't have civilian air racing we could at least have some fruitful design competition among the individualistic experimenters who every now and then come up with some mighty valuable contributions for wide application — like Steve Wittman's spring steel landing gear. Very little money would be required to attract these original designers and their brain children. These designs would kindle new interest of American youth who, in the supersonic jet age, have been cut off from tangible association with the aviation industry. Yes, the backyard airplanes that really fly, not little models gassed with eye droppers, have real appeal yet they go on being ignored.

Finally the Oklahoma setting with adequate civil and commercial aviation participation would be an excellent place for aviation meetings, reunions and get-togethers of specific groups ranging from World War II military units to trade organizations and committees.

We sincerely hope that this year's National Aircraft Show executives will cast about for new ideas and leave no stone unturned for giving the U. S. public something, if not as good as Britain's Farnborough Show, at least a show that's fresh and considerably more varied. Year-after-year repetition of the recent stereotyped military program will kill off the brilliant opportunity of making the National Aircraft Show a powerful all-industry public relations vehicle whose value can not be put in terms of dollars and cents.

Here's Progress!

THE Institute of Life Insurance reports that 87 per cent of a group of representative life insurance companies surveyed will accept at standard rates owner-operators of planes who meet certain qualifications as to age, flying experience and expected flying time. In 1948, when the last survey was made, not one company would issue such policies at standard rates.

Liberalization reflects the excellent safety record now enjoyed by business flying and increasing utilization of civil aircraft. The fatality rate has been running about one-third of what it was 20 years ago.

Of the 87 per cent surveyed about three-fifths have a limit on the number of hours expected to be spent in the air, most frequently 110 hours per year. The remaining two-fifths of these companies have a limit on expected flying hours and also a limit on the amount of insurance issued, usually $50,000. Generally the age requirement is 27 or over with 400 or more hours of solo time. When these conditions are not met the extra premiums usually range between $2.50 and $5.00 per $1,000 of insurance, depending on the combination of circumstances.

If you are a private pilot and can qualify under the new liberalization, chances are those companies to which you pay extra premiums will eliminate the rate-up.

There's only one point on which we would argue with the insurance people. In our opinion, and without actuarial figures, of course, to go by, we feel that a pilot who flies from 200 to 300 hours a year is safer than one who flies less than 100. We wouldn't be surprised if in a few years the insurance companies find this out for themselves. However, the new standard rate for those meeting the qualifications is such welcome news to aviation we'll postpone the argument on the number of hours per annum the insured expects to spend in the air. The real significance in the elimination of the extra premium lies in the ability of airplane salesmen now to break down the age-old argument that hard-headed businessmen and fearful wives always used to kill a sale — "it ain't safe and the insurance rate-ups prove it." Only ingrained fear of flying has been a greater deterrent to business airplane sales. And even here the liberalization of rates for private pilots will help immeasurably in breaking down the greatest single factor of sales resistance.

Highballing

SIT beside us as a guest at the national and regional sales meetings of any or all of the business aircraft manufacturers and

Here, at last is a mask hose connector that automatically closes when disconnected, causing a noticeable increase in breathing resistance. This increased breathing effort serves as an immediate warning signal to the wearer of the oxygen mask that he has become disconnected from his oxygen supply. The MC-3 connector incorporates the standard fitting for attaching the oxygen bail-out bottle. It is also interchangeable with present disconnects. You're safe with the Scott MC-3 connector!

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There are absolutely no signs of a drouth.

The boys have plowed the back eighty; they've had their winter chores done long ago; and they're way ahead of the oldtimers who for years expected to sell airplanes only "in season."

In other words they're "highballing"!

And in this case, mister, that's using the old railroad term for running a full head of steam. For today's business aircraft salesmen are BUSINESSMEN.

Sitting around work tables planning sales, service and market strategy has replaced the oldtime under-a-wing hangar gossip sessions. Calling on presidents in downtown offices has replaced writing or phoning for occasional week-end charter trips and sightseeing hops over the hometown. We've come a long way since the abortive boom of 1946 when our product was so-so or worse and a salesman was little more than a pilot order-taker.

Spearheading all this current trend for getting out and getting orders for finely engineered products with real utility are the manufacturers themselves. Their sales promotion and advertising programs reflect their progressiveness and aggressiveness. No little part of the success we see all 'round, especially in the sales meetings, is the practical partnership between manufacturer and distributor, the two working as a team with mutual respect.

Yes, they're really highballing!

★ ★ ★

CERTIFICATE NO. 1 of the Aviation Incentive Movement was presented recently by CAA Administrator C. J. Lowen (left, above) to John K. Evans, former chairman, and Col. Roscoe Turner, chairman, of the American Legion's aeronautics committee. The honor recognizes the Legion's support of the CAA's AIM plan, designed to create, through a system of contests, programs and scholarships, a reservoir of civil personnel trained in all phases of aviation to meet civilian need and to provide standby personnel for defense.
—(CAA Photo.)

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on a Dallas Airmotive engine. In the past six years,
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the United States Air Force, the U. S. Coast Guard,
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1. **Improves internal engine cleanliness**
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They keep confirming these facts: Cleaner oil inlet screens; remarkable freedom from piston ring and valve sticking; reduced rockerbox coking.

It simply means this—new Gulf Aircraft Engine Oil gives you *maximum operating efficiency and increased economy through cleaner engines and less frequent overhauls.* Try it and *see.*

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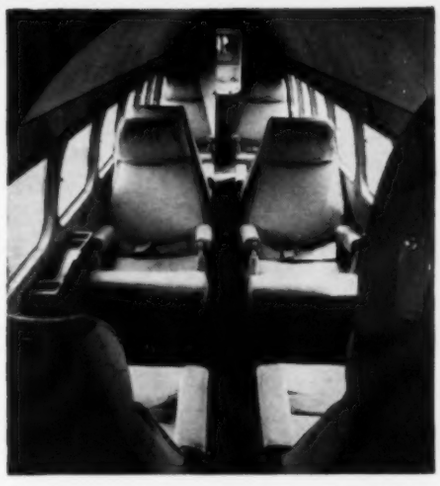
The Improved

Executive HERON

(Four de Havilland Gipsy Queen 30 Mark 2 engines, each of 250 b.h.p., driving de Havilland feathering propellers)



S.andard executive arrangement seats eight in luxury. Facing pairs of adjustable armchairs, quickly convertible into soft upholstered couches. Folding full-width tables between chairs.

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ARC Course Director

gives new Ease, Precision and Safety in Navigation

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Working with your omni/ILS equipment – single or dual – the COURSE DIRECTOR supplies *automatically computed* steering information for all EN ROUTE, INTERCEPTION, HOLDING, INBOUND AND OUTBOUND ILS APPROACH PROBLEMS. This precise steering data is clearly presented, and there is automatic compensation for cross-wind. Heart of the instrumentation is an electronic computer which performs all your calculations. The slaved gyro provides stabilized heading data. You simply set a course and *steer* to keep the vertical needle centered on your regular Cross-Pointer Meter.

Teamed with DUAL ARC Type 15D Navigational Receiving equipment, (or other standard VHF Navigational equipment), the COURSE DIRECTOR takes 90% of the work out of flying . . . offers a new high in ease, precision, and safety. See your ARC Dealer or write for detailed illustrated literature.

Reliable, lightweight, CAA Certificated

Dependable Airborne Electronic Equipment Since 1928

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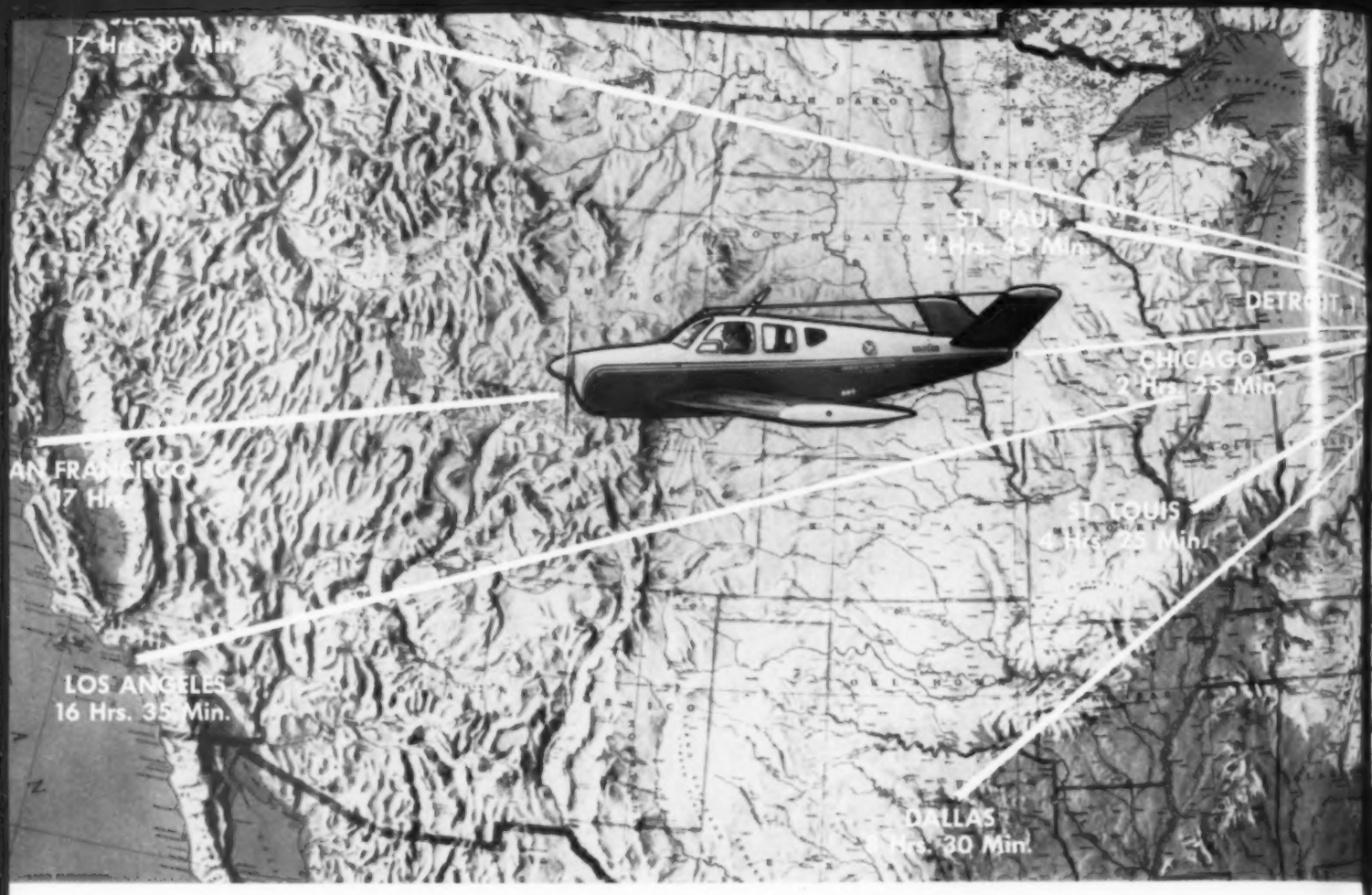
Omni Receivers • 900-2100 Mc Signal Generators • UHF and VHF Receivers and Transmitters • 8-Watt Audio Amplifiers • 10-Channel Isolation Amplifiers • LF Receivers and Loop Direction Finders • CD-1 Course Directors



Maximum Utility From Single-Engine Ai

By RUSSELL C. JARECKI

MY discussion will appear quite elementary in regard to the operation of business aircraft in general, but to some, it may prove helpful as a guide to better utilization of their airplanes. My flying is concerned with the use of single-engine equipment only, and how it best suits my own needs.

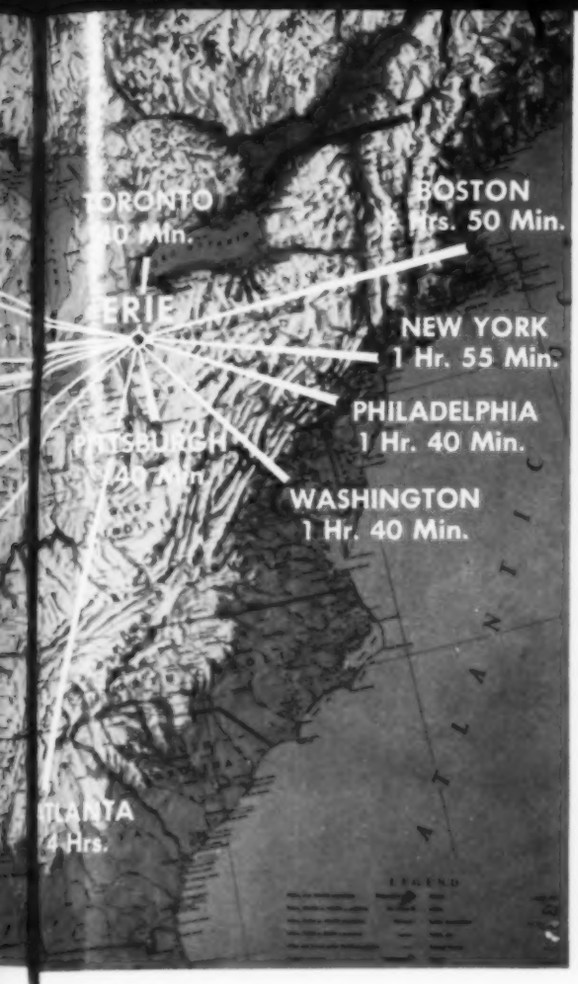
I am in my fifth year as executive pilot for the American Sterilizer Company, the world's leading producer of hospital equipment. Our factory and main office are in Erie, Pennsylvania. I have 25 years of flying behind me with some 9,000 to 10,000 hours, and am currently operating a Beechcraft F-35 Bonanza (we traded in a C Bonanza for it). Our choice of the airplane was based on many years of experience and the selection has proved to be a wise one from every standpoint.

Our present equipment includes 60 gals. of fuel plus conventional electronic equipment such as ILS, omni, ADF, standard VHF-LF transmitter-receiver—plus a 36-channel transmitter-receiver. All of this is manufactured by Lear, Inc. I consider it essential equipment, without which I might as well forget trying to obtain aircraft dependability in transportation.

Most of our flying centers east of the Mississippi River, with occasional trips to the West Coast (Los Angeles and San Francisco) and to Dallas. With the Bonanza, we cover every major city from Miami to Boston and from New York to Chicago, St. Louis and St. Paul. That is a large territory and we average about 12,000 miles per month, or 80 hours of flying time. To date, we have flown over 750,000 miles at 92% efficiency. This simply means we complete 92 out of every 100 trips as planned, cancellations being due to weather in each case. About 7% of this has been instrument time and less than 2% at night. Our trips are generally about 300-500 miles in length, with many trips per month to Pittsburgh, Cleveland, Buffalo, Chicago, New York and Detroit.

A word about scheduling is probably informative to others. As pilot, I work with one person in the company who is charged with the responsibility of posting flight schedules on the bulletin board and coordinating each department's travel requirements. I usually have a week's schedule lined up in advance.

Until recently, we did not have weather maps available at our base city, Erie, and I usually plot the fronts, systems and other data myself from the teletype code on a large-scale plastic overlay of the United States. Because of the importance of knowing 12 hours ahead whether to cancel a flight or not, I must work constantly on map revisions and forecasts, frequently making my own forecasts. My other source of information is pilot reports. To get them first hand, I have some taken during the night, if available, and also plan to get out to the weather office at least two hours before flight time. By the time for take-off, I have as detailed a picture as is humanly possible to obtain and in this way I will have eliminated practically all of the guesswork from the problem.



This business pilot has an impressive record of schedule completions—while averaging 1,000 hours of flying a year

Aircraft

Experience shows that our primary problem is one of weather, as far as executing our operations policy is concerned. Because of equipment limitations, a very conscientious attitude to each problem is essential. This requires a good, solid background of weather flying with full knowledge of its hazards to single-engine operations.

It takes a lot of planning and preparation to avoid aborting a flight. This may not concern the individual who has only his own time and work to consider, but it is necessary for those of us who have to think of our passengers and making air travel dependable for them and the company. When I plan a flight, I am certain it will be satisfactorily completed unless conditions are extremely variable. I have learned that an excellent schedule can be maintained in single-engine equipment by adhering to a few sound rules and techniques.

Let me stress here and now that, unlike the operator of heavy equipment, the lightplane pilot should stay out of heavy and severe turbulence and bad icing conditions—and also that all, absolutely every bit, of the guesswork has to be ironed out and eliminated beforehand or you are just asking for certain trouble.

I could cite dozens of recent flights to illustrate how careful planning pays off for me. But they would not necessarily apply to any other operations other than they serve to illustrate a pattern to follow, namely one of conservatism and painstaking analysis before each flight. Those involving limited instrument operations conform to standard patterns of on-top conditions, post-frontal weather and the like. I avoid at all costs such things as com-

(Continued on page 48)

The author behind the wheel of his firm's Bonanza, welcoming aboard one of many company men who travel with him. His trips begin an hour or two at the airport before the passengers arrive, finding him and the airplane all ready to go.

The final assembly line at Mooney Aircraft, with six 4-place Mark Twenty's in various stages of completion. This modest enterprise uses a hangar for a factory and its high efficiency in utilizing space keeps costs down. The 150-hp. Mark Twenty is of composite construction, using steel, aluminum, plywood and fabric. —(Mooney Aircraft Photo.)

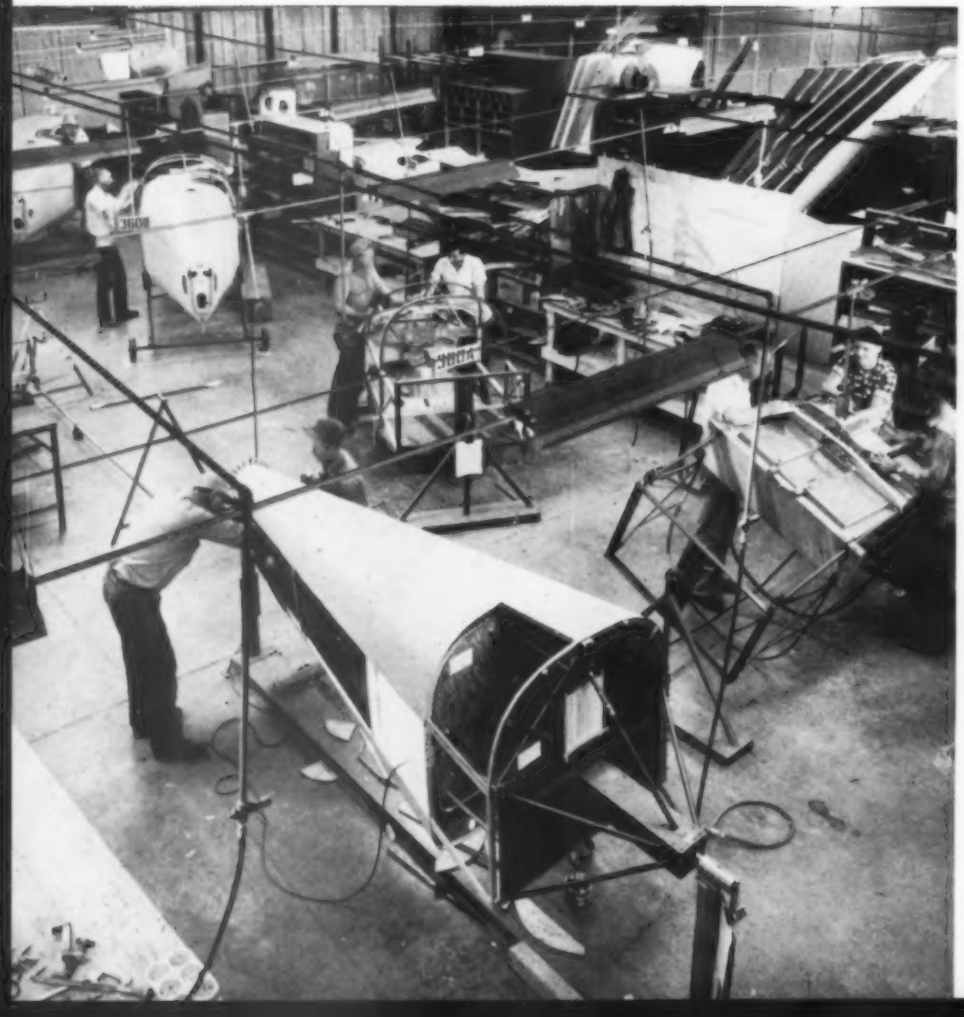
Mooney's In Business

By GEORGE HADDAWAY

THERE are no miracles in any kind of airplane production — commercial or military, and least of all in the hazardous business of building lightplanes as past history will loudly testify.

Mooney Aircraft, Inc., now building the high-performance 4-place M-20 at Kerrville, Texas, is no exception. They've had a mighty rough go of it since the day in 1951 Al Mooney announced he had the design on his drawing board. But a recent visit to the spacious little factory on Louis Schreiner airport in the hill country north of San Antonio gave convincing evidence that the rough days are over and CAVU weather lies ahead.

Long in the development stage, plagued by the usual vicissitudes attending all new designs plus those involved in moving 700 miles into another state, a change in ownership, complete re-financing together with arduous CAA approval tests and finally, tooling up for production, Mooney Aircraft is now "out of the woods" with healthy production of one plane every 3 days now and a growing list of hard-selling distributors. Before the



Production tooling has been developed to a high degree at Mooney Aircraft. Here are workers building up major fuselage components in a corner of the factory. Production of horizontal stabilizers is seen in the background. —(Mooney Aircraft Photo.)

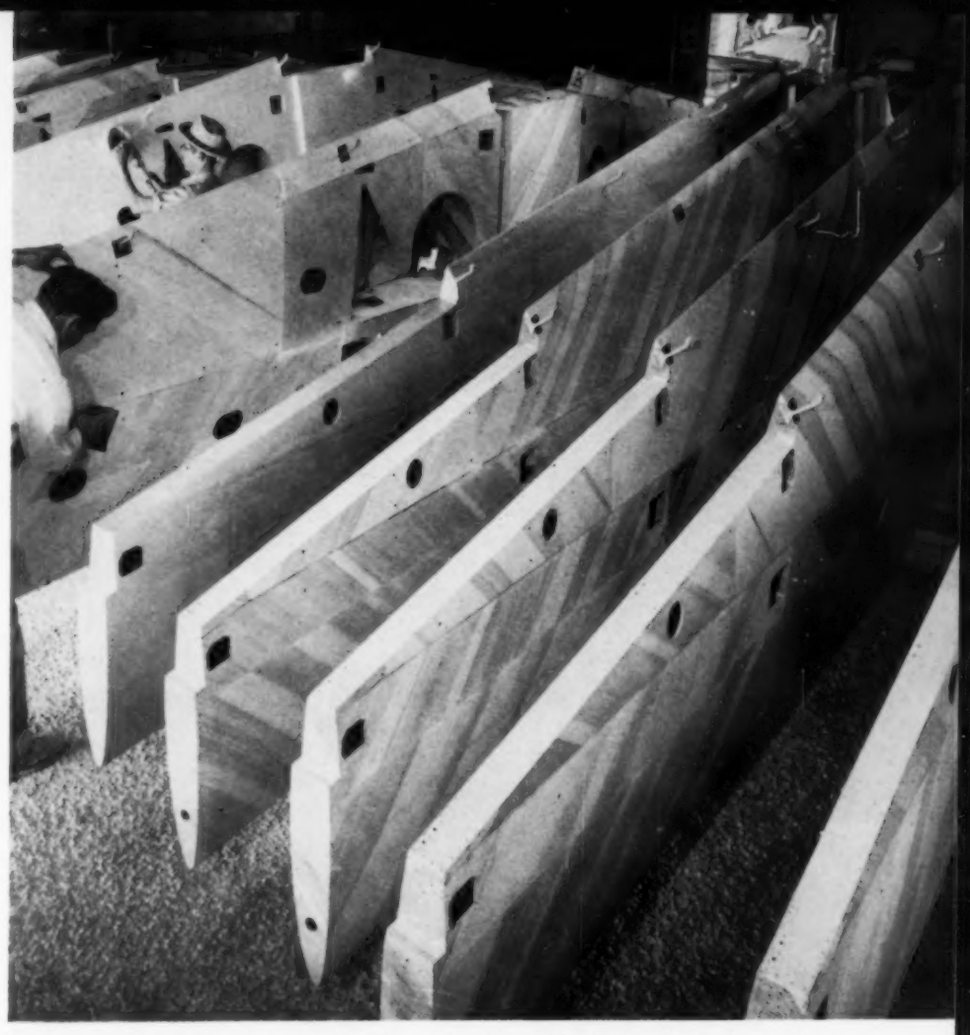
year is out Mooney looks for 5 units per week, which will call for a few additions to their labor force, now over 100 men, and some minor additional tooling.

That may be small potatoes in comparison with present production schedules at Cessna, Beech and Piper. But it wasn't too long ago that 5 a week was darned good business for any company delivering airplanes that cruised above 150 miles an hour, carried four people and stayed within the "medium" price range.

A visit to the Mooney factory reveals an impressive, economical use of floor space, very similar to the amazing amount of production Aero Design gets out of their facility at Bethany, Oklahoma. We wouldn't be surprised if the Mooney production people had visited and been inspired by the Aero Commander factory. Utilization of dead air space in the vaulted Kerrville hangar is part of the secret. The upholstery shop is elevated atop the enclosed wood shop — enclosed for temperature and humidity control. Likewise a healthy inventory of raw materials and spare parts is housed on "second floor" decks within the hangar and in easy access to the factory floor.

The new owners of Mooney, who took over after the death of pioneer lightplane investor, Charles G. Yankey of Wichita, Kansas, are Hal Rachal and Norman Hoffman, who also operate the West Texas Flying Service

(Continued on page 53)



Readers familiar with plywood aircraft construction will admire the workmanship seen in these pictures of wing production at Mooney Aircraft. In the paint shop (above), the wings await final finishes. The Mark 20 has a laminar-flow airfoil which benefits from the drag-free surfaces provided by the smoothest of plywood surfaces. Spar production is shown below, with the welding department and machine shop at bottom. —(Mooney Aircraft Photos.)

Here's Aircraft Radio Corporation's fleet of business aircraft. The new ARC Twin-Bonanza is shown in front of its single-engine Bonanza and Navion.

New ARC Flying Lab and Showcase

AIRCRAFT Radio Corporation of Boonton, New Jersey, which manufactures the widely-used ARC line of radio and electronic navigation and communications equipment for business aircraft, has numerous new developments under way and has added a third airplane to its fleet of demonstrators. The new airplane is a Beech Twin-Bonanza and it will feature a minimum of two complete sets of ARC equipment at all times.

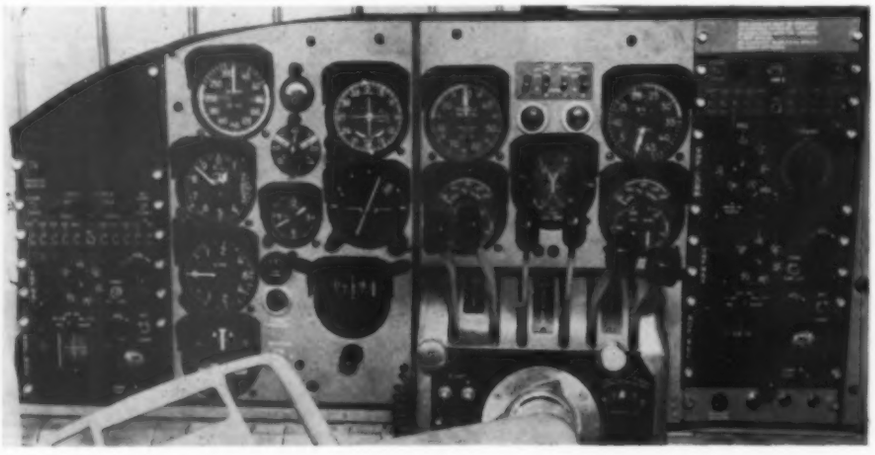
Major expansion is being carried out by ARC, in facilities, new designs for equipment and increasing equipment sales. The new equipment features improved quality standards for better performance, smaller packaging and weight reduction.

An example of the space and weight reduction program is the dual installation of ARC communications and navigational equipment already made in the new ARC Twin-Bonanza. This dual installation has a total weight of only 150 lbs., as compared to comparable equipment of obsolete design which weighs between 350 and 400 lbs. for a similar dual installation. The new system, as a single installation, weighs about 114 lbs., but the dual installation weighs proportionately less because some of the "hardware" does not have to be duplicated.

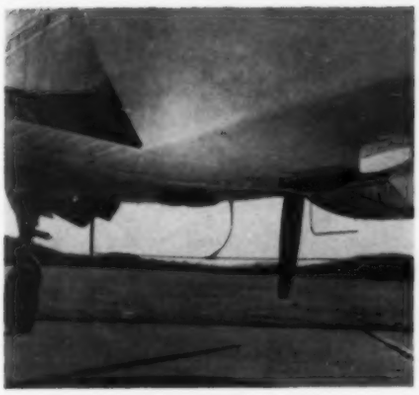
In the Twin-Bonanza, the demonstration pilot can carry on normal operations with one set while the other set of facilities can be tested or demonstrated independently. The basic equipment, covering what ARC describes as complete requirements for instrument flight operations anywhere in the U. S., includes the following units:

Dual Type 15D VHF omni navigational receivers.

Dual Type 21 ADF receivers (just now going into production).



Part of the instrument panel in the new ARC Twin-Bonanza is shown at left. ARC features the use of currently-standard 5¾-in. edge-lighted console panel controls. Note, on each side of the instruments, dual controls for ADF and omnis, plus controls for marker beacon, glide-slope, audio selection and communications. In the top center are the ARC combination course selector and cross-pointer meter. The course director selector is above the clock. At lower center is the slaved gyro, with its slaving indicator to its left. ADF needle indicators are not shown.



Two ADF loop housings, a VHF antenna and a sense antenna for the second ADF are shown in this view of the Twin-Bonanza belly. The loop housings protrude only 2 ins. below the skin.

R-19 VHF communications receiver.
Three T-21 VHF transmitters (providing 30 channels).
R20 marker beacon receiver.
Dual CD-1 course directors.
F-11A isolation amplifier.
Glide slope receiver.

The newest ARC equipment to be described in detail is the Type 21 miniature automatic direction finder, or radio compass. Its total weight is listed at 19.1 lbs. for the 3-band superheterodyne receiver, complete with power unit, indicator, control unit, loop, loop housing and all connectors.

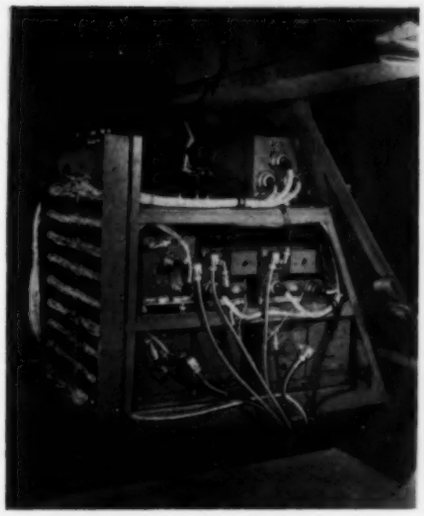
Operating over the 190-1,750-kc. spectrum with 14 premium type subminiature vacuum tubes, the Type 21 ADF is said to have sensitivity and selectivity fully comparable to equipment now in use weighing three times as much. Its P-14 power unit, included in the weight given, is a dynamotor supplying all necessary DC at 120 volts, plus all necessary AC at 100 cps. Speed is regulated internally.

Weight breakdown is given as follows:

R-30 receiver, including connectors and M-26 mounting, 7 lbs.
P-14 power unit, including connector, 4.8 lbs.
L-11 loop, including connector, 4.3 lbs.
C-59 control unit, including connector, 1.6 lbs.
IN-12 indicator, including connector, .9 lbs.
Streamlined housing for L-11, .5 lbs.
Total weight, 19.1 lbs.

The control unit for the Type 21 ADF is the standard military edge-lighted console type. Its components are available to ARC dealers for production of custom panel installations.

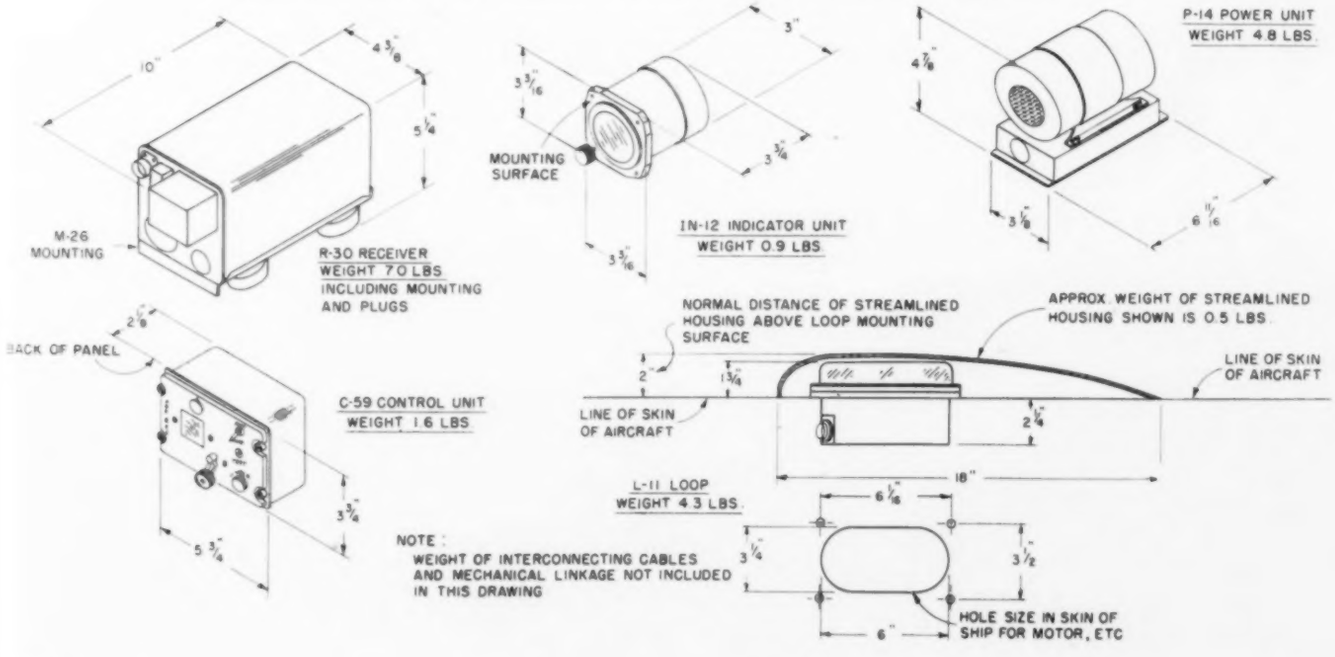
ARC spokesmen said they selected the Model C50 Twin-Bonanza as their third demonstrator on the basis of several special requirements for the particular modifications planned by ARC. For one thing, there was the requirement for test-bed space outside the cabin area and where changes could be made quickly and without structural modifications. These test-bed facilities are in the nose of the Twin-Bonanza, the location providing greater temperature range, typical vibration conditions and close approximation of characteristic field installation conditions. The permanent equipment installations are housed in the rear baggage compartment. A second requirement was for a cabin configuration which would permit as many as five passengers to view the instrument panel and the actual flight conditions at the same time.



The Twin-Bonanza's permanent radio rack is shown behind the rear seat in the baggage compartment. Its junction box is shown with cover off. On the bottom shelf are the dual omni sets. On the center shelf, at left, is one of the communications systems and, at right, the dual ADF's. On the top shelf is the 10-channel isolation amplifier, with a cabin speaker amplifier to its rear. Other units are out of sight.

Flight tests of ARC equipment are conducted to provide comprehensive checks on validity of the regular environmental tests for shock, vibration, humidity effects, voltage extremes and the like, using advanced scientific techniques in ARC laboratories. Thus, by using the nose compartment of the Twin-Bonanza as an experimental test-bed, ARC can check on operational and systems problems which seldom can be duplicated on the ground. ★ ★ ★

Below are the units of the new ARC Type 21 ADF, showing dimensions and weights for each.



Tactical units are getting supersonic Lockheed F-104A Starfighters soon — photos at left show the XF-104 with tip tanks and the production model F-104A with metal intake covers, apparently hiding adjustable means for overcoming supersonic inlet problems. Note wing anhedral. Starfighter has span of only 21 ft. 11 ins., length of 54 ft. 9 ins. and height of 13 ft. 6 ins.
—(Lockheed Photos.)

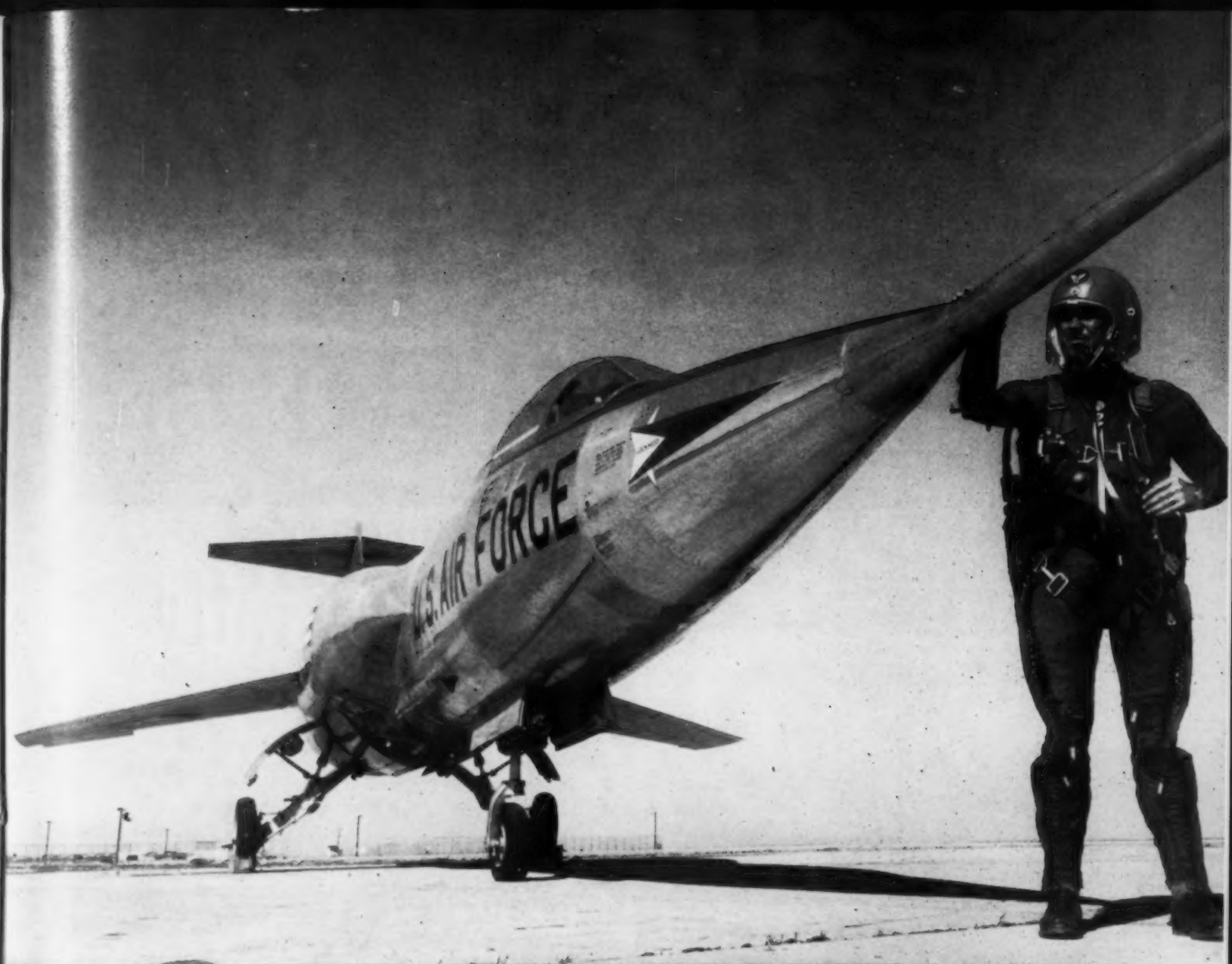
New Era Fighter

FAMILIAR jet combat planes are giving way to a new breed of very high performance designs in the U. S. Air Force which can well be described as "aeronautical bolts of lightning in the upper stratosphere." The trail-blazer for the newest of these supersonic shockers is the new Lockheed F-104A Starfighter, which has been in production for some time but for which photos and barest details were released only last month.

The 104A ushers in a new age with its straight, knife-edge, stubby wings; its tremendous although indisclosed power-to-weight ratio — its speed going uphill in a climb is equal to its straight-and-level velocity; and its performance capabilities, unrevealed but believed to be in the Mach 2 region of 1,300 mph. and more.

It looks, says Herman (Fish) Salmon, Lockheed chief engineering test pilot, like it must be too hot to handle. But Fish says it is actually smooth to control and "responds with precision and speed." A. W. (Tony) LeVier, director of Lockheed's flying operations and first to fly the XF-104 in February, 1954, over two years ago, calls it "the most exciting airplane in America today." General Nathan F. Twining, Air Force chief of staff, has pronounced it as the "fastest and highest-flying fighter anywhere in the sky." Tactical units are receiving F-104A's soon and production has already been greatly expanded.

Long, needle nose and very short span of wings distinguish the Starfighter. Its wings are the thinnest ever used on any airplane, their leading edges being so sharp that covering sheaths are used to protect ground crewmen. These wings extend only 7.5 ft. from fuselage to tip. Horizontal tail is all-flying, has no elevators. —(Lockheed Photos.)



Two spectacular views of the F-104A (top) and XF-104. To use downward-ejecting seat, pilot pulls a handle to automatically (a) depressurize cockpit, (b) become fastened to seat by mechanical straps and clamps, (c) detonate cartridge which jettisons belly hatch and ejects seat, and (d) be freed from seat after which 'chute opens at pre-set altitude. —(Lockheed Photos.)

The F-104A gets optimum speed and maneuverability from trimming out all possible airframe weight and from avoiding all possible complexities, says Hall Hibbard, Lockheed engineering vice president. C. L. Johnson, the firm's vice president for research and development, says it weighs less than any operational jet combat plane.

Efficient operations both below and beyond sonic speeds are possible with the new General Electric J-79 engine which powers the F-104A. No engine performance details are given, but at top speed the J-79 with afterburner develops half its thrust as a ramjet, using compression of air from sheer speed. Advanced-design supersonic air intakes are a feature of the Starfighter. ★ ★ ★

Morrisey Nifty has fixed tricycle gear with steerable nose-wheel. Note visibility from both seats. Landing speed with high-lift flaps is 47 mph., cruising speed 110-mph. with 90-hp. engine and 120 mph. with 115-hp. engine. Its 24-gal. fuel tank is between windshield and firewall.
—(FLIGHT MAGAZINE Photos, except bottom.)

The Morrisey Nifty

WHAT is the formula for a new 2-place lightplane meeting today's market requirements to the extent that immediate production could be started? A lot of people would like to know — including Bill Morrisey of Santa Ana, California. Morrisey, former chief of flight test for Douglas Aircraft at Santa Monica, has put seven years of work into building his idea of the correct answer. He then went the rest of the way and had his new airplane CAA type certificated. Now he is touring the country in it, asking operators to hop it and give him their reactions.

The Morrisey Nifty is an all-metal, tricycle, low-wing, 2-place lightplane with tandem cockpit, using either a 90-hp. or 115-hp. engine. Its performance and specifications are listed by Morrisey as follows:

	115 hp.	90 hp.
Max. Spd., mph.	132	125
Norm. Cr. Spd., mph.	120	110
Landing Spd., mph.	47	47
Rate of Climb, fpm.	1,000	850
Svc. Clng., ft.	18,000	16,000
Range, mi.	440	440
Fuel, gals.	24	24
Gr. Wt., lbs.	1,450	1,450
Util. Gr., lbs.	1,363	1,363

(Continued on page 51)

NATIONAL AIRLINES

AIRLINE OF THE STARS

CHOOSES ALLISON TURBO-PROP ENGINES

and Aeroproducts Propellers for new fleet of over-400-mile-an-hour Lockheed Electras, World's most luxurious airliners

National's fleet of twenty-three new Allison-powered Lockheed Electras will give passengers jet-age speed, comfort and performance between 37 cities in the U.S. and Cuba.

Pioneering a whole new generation of U.S. air transports, these Allison-powered Electras will give you:

FASTER FLIGHTS than in any airliner now flying—cruising speeds of over 400 miles an hour

RAPID TAKE-OFFS from airports now regularly served

HIGHER CRUISING ALTITUDE for greater latitude in selecting favorable flying conditions

NEW COMFORT AND CONVENIENCE — unprecedented new standards of smooth, quiet, restful air travel

HIGHEST DEPENDABILITY — proved by Allison's record of more than 8 million hours of turbine engine flight time

The Allison Turbo-Prop is a gas turbine engine, similar to a jet, but its tremendous power is geared to a matched Aeroproducts Propeller for higher efficiency and better fuel economy.

With Allison Turbo-Prop power — a matched engine-propeller team — General Motors again demonstrates its leadership in the development of more efficient power for all kinds of transportation.

Our sincere congratulations to National Airlines on their choice of this great new power — an outstanding contribution to the never-ending progress of our nation's air travel.

ALLISON
TURBO-PROP POWER

ALLISON DIVISION OF GENERAL MOTORS
Indianapolis, Indiana

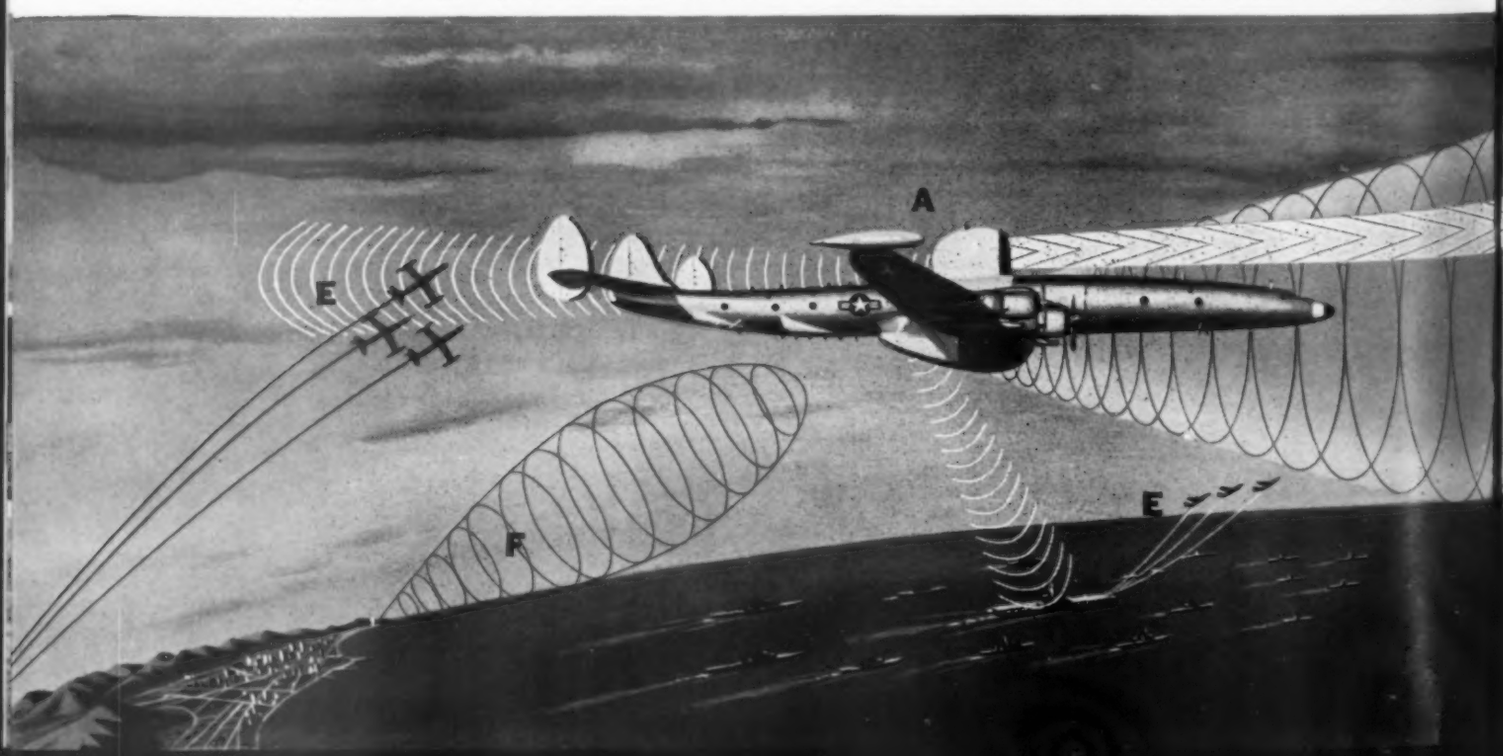
AMERICAN BUILT FOR THE JET ERA IN AIR TRAVEL

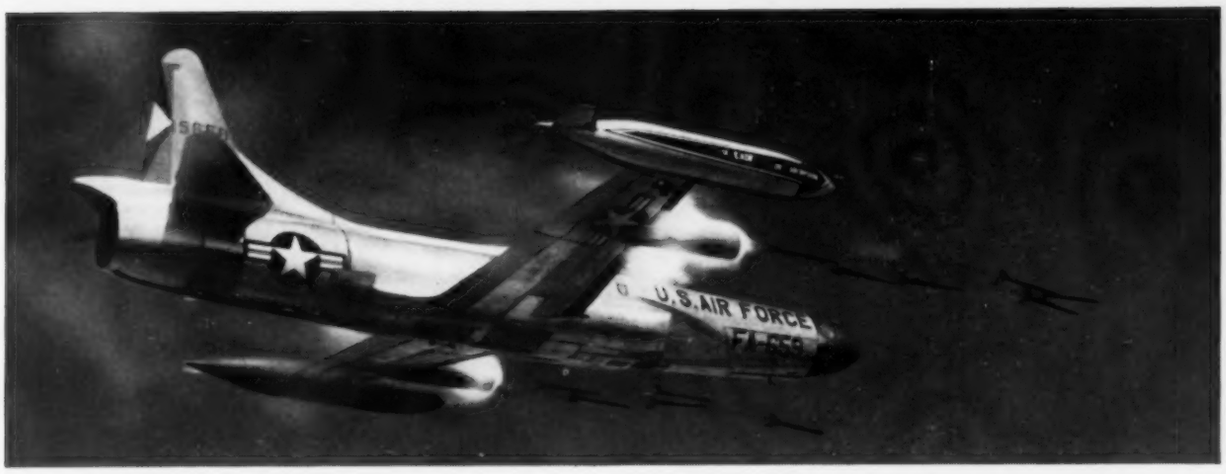
New U.S. Concept for

TOTAL DEFENSE

In this age of awesome airborne nuclear weapons, a vast umbrella of airborne electronics will safeguard our nation against sneak attack

BELOW—A WEAPONS SYSTEM IN ACTION. An electronics-laden Super Constellation early-warning plane (**A**), patrolling our outermost defense perimeter hundreds of miles from our shores and borders, from its high altitude can "see" beyond the horizon and detect both high-flying and low-flying enemy aircraft (**B**). Using its powerful search radar (**C**) and height-finder radar beam (**D**) to pinpoint position of invaders, the patrol plane alerts our interceptors (**E**), which swarm aloft and are radar-guided through fog or darkness to intercept and



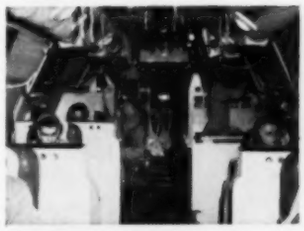


LEFT—EARLY-WARNING RADAR PATROL. Designated the WV-2 by U.S. Navy and EC-121 by USAF, these radar-domed Lockheed Super Constellations carry six tons of electronics and a 31-man crew. Super Constellations are ideal for this duty because of their famed all-weather stability and extremely long range.

ABOVE—ROCKET-FIRING STARFIRE INTERCEPTOR. First of the almost-automatic all-weather interceptors, the Lockheed F-94C Starfire is an example of Lockheed's leadership in the design and development of airborne electronics. This deadly defender and other interceptors will soon be supplemented by—

Farsighted Pentagon planning and recent amazing technological developments by U.S. science and industry are rapidly making our nation's TOTAL DEFENSE system the most formidable in all history.

Lockheed's role in implementing our new Weapons System concept and in Systems management, is an important one. Thousands of Lockheed military aircraft, of *nine* widely different types, are already in service. Other advanced planes, missiles and electronic guidance devices are in production, undergoing tests or on the drawing boards at Lockheed. And Lockheed's pioneering leadership in design and development of airborne electronics will continue to contribute heavily to TOTAL DEFENSE.



STILL-SECRET F-104 SUPERSONIC JET FIGHTER. (Photo not yet released.) A high-ranking USAF officer said of the F-104: "This is a fighter pilot's dream. We feel confident that it is the fastest, highest-flying fighter in the air, anywhere."

THREE PHOTOS AT LEFT show crew members of Super Constellation early-warning plane at work. (Top) Navigator plotting a fix; (center) observers at radar consoles plotting altitude, speed and course of unidentified aircraft; (bottom) fighter-director charting position and path of approaching aircraft.

Lockheed

AIRCRAFT CORPORATION

California Division, Burbank, Calif.
Georgia Division, Marietta, Ga.
Missile Systems Division, Van Nuys, Calif.
Lockheed Air Terminal, Burbank, Calif.
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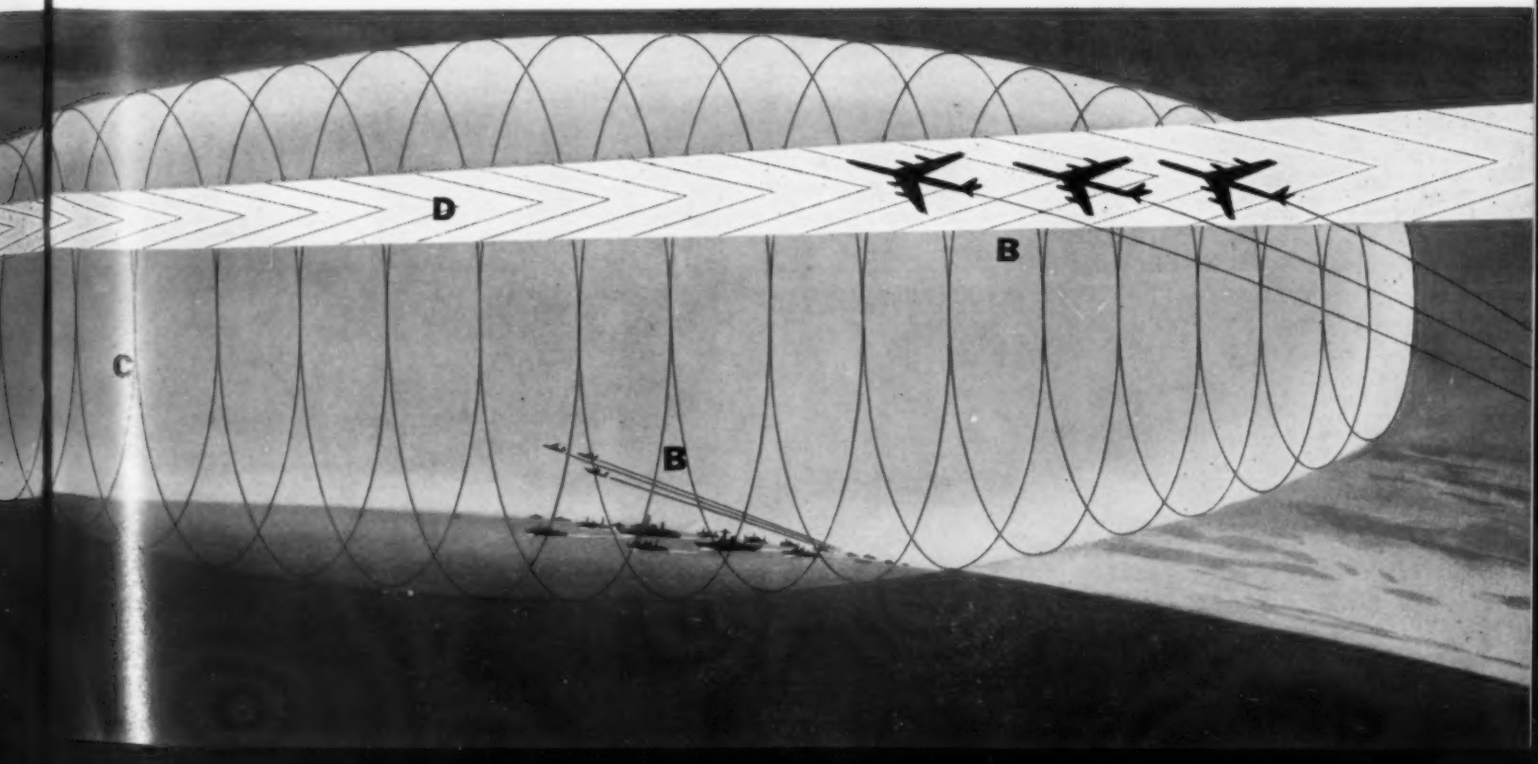
LOOK TO LOCKHEED FOR LEADERSHIP

A CAREER IN MILITARY AVIATION ASSURES A FINE FUTURE FOR YOUNG MEN OVER 17. SEE YOUR NAVY OR AIR FORCE RECRUITING OFFICER.

destroy the attackers with high-speed rockets or missiles. Any enemy aircraft penetrating our barrier patrol areas would be detected by shore-based radar stations (**F**) and Ground Observer Corps outposts continuously manned by patriotic civilians helping to keep our nation free.



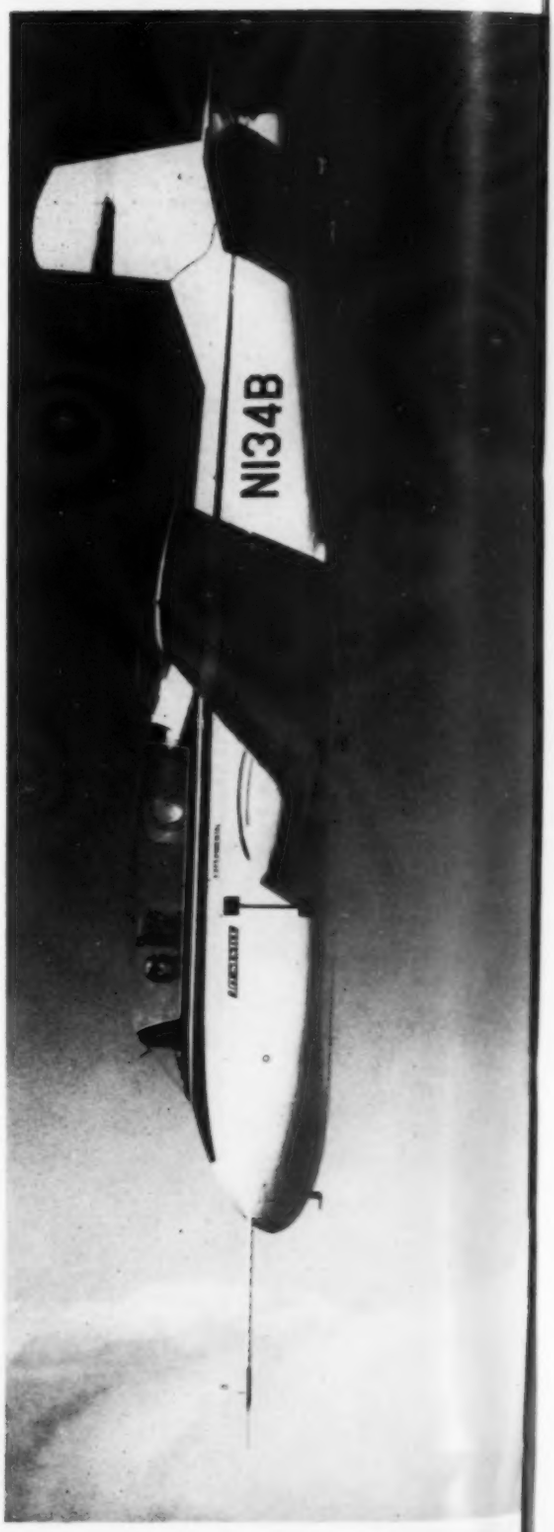
Jet Mentor Go Power

STANDING the Beech Model 73 Jet Mentor on its tail in a climb or on its nose in a dive is easy for Factory Test Pilot Tom Gillespie, as these pictures show. But to photograph the new jet in these positions was far from easy for Factory Cameraman Jim Yarnell.

Yarnell didn't have a jet to shoot from — he had to use a slower, propeller-driven T-34 Mentor trainer. This ruled out formation flying around a loop. Instead, the photographer had to shoot from level flight as the jet shot past.

The Jet Mentor has been flown to Patuxent for Navy evaluation and is being demonstrated at other military bases. It has a 295-mph. top speed, a 500-mph. diving speed, and has been wrung out in all forms of aerobatics, including extended spins at all CG configurations and inverted.

★ ★ ★



Beechcraft BONANZA FOR '56

TOP STANDARD OF THE AVIATION WORLD

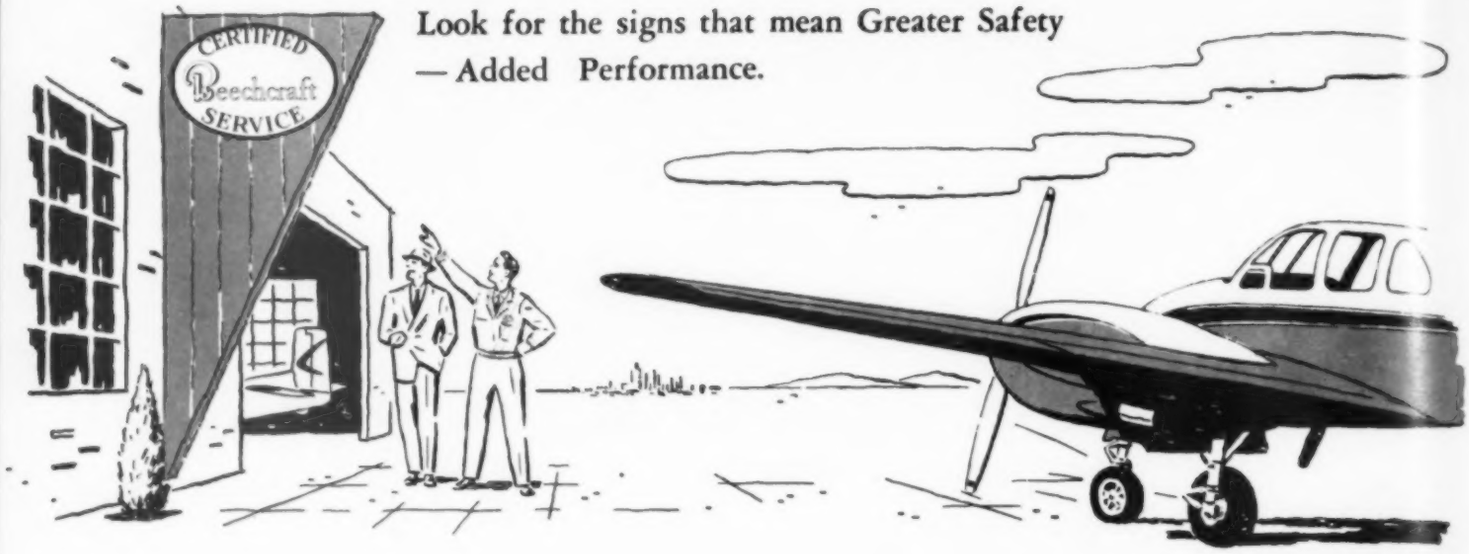
Enjoy the complete relaxation, luxurious comfort and unexcelled efficiency of business flying in a '56 Beechcraft Bonanza. Nowhere is there an airplane that can do so much for you — so comfortably, so safely, so efficiently.

Time almost stands still for you as you cruise above earth-bound traffic in a new Beechcraft Bonanza for '56. You can whisper — that's all the Bonanza does — in the quiet of the soundproofed interior. It's stronger, safer, faster, has more visibility and flying comfort than any competitive aircraft. This marvelous Beechcraft gives you 184 miles-per-hour on less fuel than it takes to operate most automobiles. *That's efficiency!* And *that's* what your business will have when you put a 1956 Beechcraft Bonanza to work for you.

The J. D. Reed Company will gladly demonstrate how a Beechcraft can save you valuable time and money. You will always find the J. D. Reed Company staff anxious to serve your every requirement in aviation.

"THE WORLD IS SMALL WHEN YOU FLY A BEECHCRAFT"

J.D. REED CO. INC.
SALES SERVICE
Beechcraft
DISTRIBUTOR
MUNICIPAL AIRPORT
HOUSTON, TEXAS



Look for the signs that mean Greater Safety —Added Performance.

To obtain the best service for your Beechcraft visit the Certified Beechcraft Service Stations listed.

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ANDERSON AIR ACTIVITIES
General Mitchell Field, Milwaukee, Wisc.
Truax Field, Madison, Wisc.

ATLANTIC AVIATION CORP.
Teterboro Airport, (25 minutes from Times Square)
Teterboro, New Jersey
Logan Airport, East Boston, Mass.

ATLANTIC AVIATION SERVICE, INC.
New Castle County Airport, Wilmington, Delaware
Philadelphia International Airport, Philadelphia, Pa.

BUTLER CO., AVIATION DIVISION
Municipal Airport, Chicago, Ill.

CURREY SANDERS AIRCRAFT CO., INC.
Downtown Municipal Airport, Shreveport, La.

CUTTER-CARR FLYING SERVICE, INC.
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GRAY AIRCRAFT SVC. CO., INC.
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ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport, Indianapolis, Ind.

J. D. REED CO., INC.
Municipal Airport, Houston, Texas

TEXAS AVIATION CORPORATION
G. K. Roberts, Pounds Field
Tyler, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport, Topeka Kansas

TRADEWIND AIRPORT CORP.
Tradewind Airport, Amarillo, Texas

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Hangar 8, Municipal Airport, Tulsa, Oklahoma

New heights of performance demanded by today's busy executives also demand new standards of precision.
Beechcraft owners have long been accustomed to the high performance and precision built into Beechcrafts. We are dedicated to preserve these qualities through our know-how of maintenance of Beechcrafts in completely equipped facilities.
You can count on our trained specialists to use their precision Beechcraft service methods to maintain top performance of your airplane. Let us explain our regular maintenance plan . . . Visit us soon.

...PERFORMANCE

1170 miles non-stop

Fully-retractable tricycle gear

Largest windows in the sky

THE '56 BEECHCRAFT BONANZA IS

Your BEST Buy!

Here's why the Beechcraft Bonanza can do more for you than any other single-engine business airplane:

★ **SAFEST** — the Beechcraft Bonanza has the best safety record of any four-place single-engine airplane per million miles of business flying.

★ **STRONGEST** — the Beechcraft Bonanza is the only single-engine business airplane licensed at full gross weight in the Utility Aircraft category.

★ **FASTEST** — the Beechcraft Bonanza cruises at 190 mph at 75 percent of power.

★ **QUIETEST** — the sound level inside the cabin of the Beechcraft Bonanza is the same as inside a modern automobile traveling 60 mph — no other airplane flies as quietly.

★ **GOES FARTHER** — with auxiliary fuel tanks, the Bonanza has a range of 1170 miles.

★ **MOST USEFUL** — the Beechcraft Bonanza can carry more passenger and baggage weight than any other single-engine business airplane.

★ **MOST EFFICIENT** — you'll find the new four-place Beechcraft Bonanza can be the *most efficient* working partner your business will ever have.

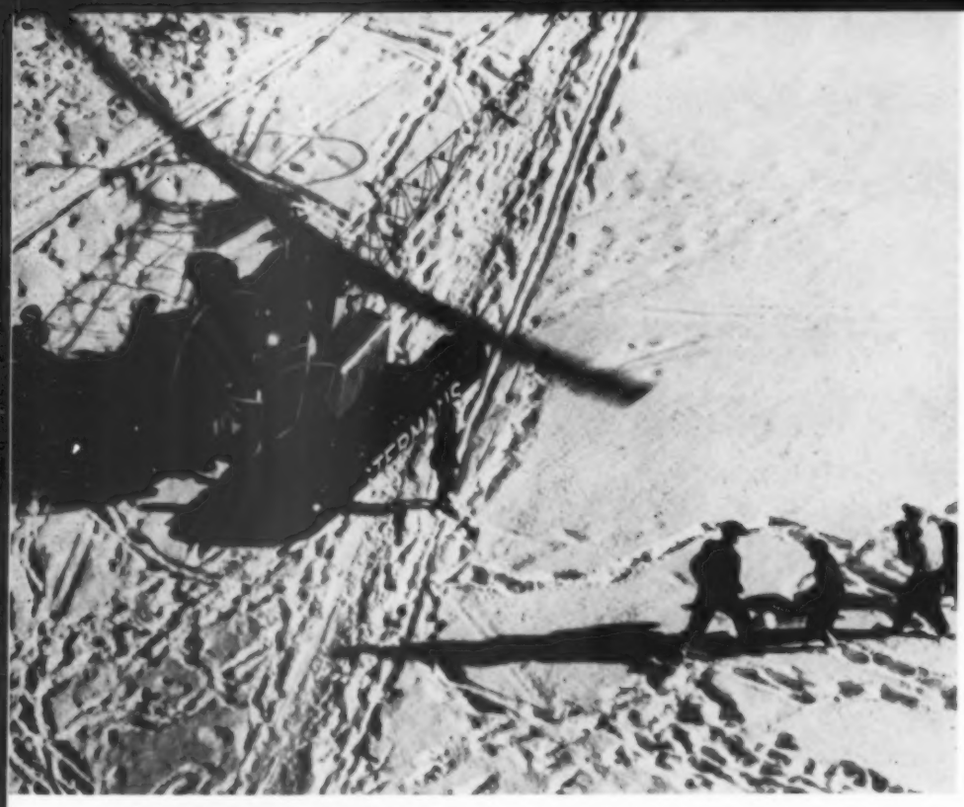
See your Beechcraft distributor or write
Beech Aircraft Corporation, Wichita 1, Kansas.

★All statements based on official government and industry records, statistics and surveys. Performance data based on factory specifications and guaranteed ±3%.

ASK ABOUT BEECHCRAFT'S ATTRACTIVE NEW LEASE AND FINANCE PLANS

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



Osterman copters are the only transport operating to many Stockholm archipelago areas from January through April (left). Lennart Osterman is shown above (right) with Cully Weadock, Bell Aircraft commercial sales manager. Osterman's unique litter, with door opening, is shown at left below.

Success In Sweden

THE spread of commercial helicopter operations around the world has launched interesting and successful new aviation institutions in many countries. One is Osterman Aero of Stockholm, Bell helicopter distributor for Sweden, Norway and Finland. It operates 9 Bells and 2 Sikorsky S-55's all over the north country, including Arctic areas, handling the multitude of special services which have made copters indispensable everywhere.

"We started the world's first scheduled helicopter mail service in 1948," Lennart Osterman told FLIGHT MAGAZINE on a visit last month to Bell Aircraft Co. It is still growing, especially in the dead of winter when helicopters are the only dependable transports to many otherwise isolated communities in the island-dotted Stockholm archipelago. Osterman's copters distribute food, medicine, newspapers, money orders and other necessities in addition to mail. They even fly school children home on weekends. They are chartered in mining, agricultural, shipping, power industry, forestry, rescue and other work, including military pilot and mechanic training. Osterman has 14 pilots, 14 mechanics and 32 other personnel in its helicopter operations.

★ ★ ★

Otherwise isolated by heavy winter storms, Scandinavians depend on Osterman copters for mail, newspapers, food, medicine, clothing, money orders and other necessities. These photos show a Bell mail ship.

shortest time between 2 points... is by **BELL** helicopter

WHEN Radio Materials Corporation of Chicago, manufacturers of electronic components, added a new plant 135 miles away in Attica, Ind., it solved an expansion problem but ran into a transportation problem.

Executives shuttling between the two facilities were losing valuable working hours enroute. Road travel meant a three or four hour trip and even when using the company's fixed wing airplane, the two hours by auto between plants and airports couldn't be overcome.

But Board Chairman Joseph F. Riley met the situation by adding to his traffic department one of Bell Aircraft's new three-place executive helicopters — the Model 47H BELLAIRUS.

Now Riley and his executives make the trip by helicopter from the roof or parking lot of one plant to the other — in 90 minutes or less. At a minimum, this will save an estimated 1000 expensive management hours a year. Equally important is that the helicopter service operates at the dictates of business — not the weather.

BELL Aircraft CORPORATION

Your inquiries invited

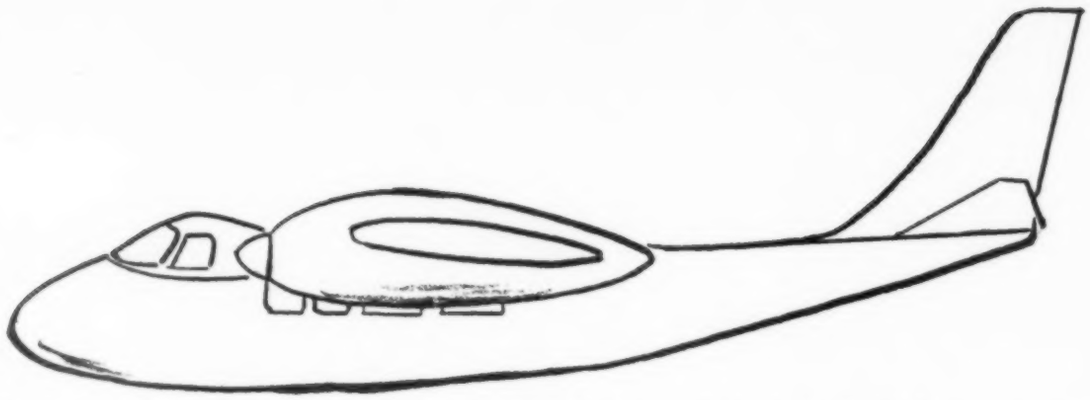
Sales Manager, Dept. 12

TEXAS DIVISION • P. O. BOX 482

FT. WORTH, TEXAS

RMC's RILEY SAYS "We are finding that just the possibility of a helicopter trip is creating an unexpected sales appeal to potential and existing customers. So you might say the Bell helicopter is a valuable addition to our sales force in addition to serving as a vital administrative tool."

Radio Materials Corporation's experience with the time and money saving features of Bell helicopters is typical. These helicopters provide safe and quick transportation at low initial and maintenance cost. They are the most widely used helicopters in the world.



This rough sketch resembles the airplane envisioned by the author. Enlarged nacelle for 8-cylinder 510-hp. Lycoming contains saddle fuel tank above the wing. Raised cockpit dome resembles that of the Dove. See sketch on page 44 for cabin cutaway.

Design Proposal for Pressurized Light Twin

A Pilot's Suggested "Stretch" of the Aero Commander
Powered by 510-hp. Lycoming 8-cylinder GSO-720 Engines

No. Places	**6**
Take-off Power	**1,020**
Gross Weight, lbs.	**9,600**
Empty Weight, lbs.	**5,940**
Useful Load, lbs.	**3,660**
Cruising Spd., mph.	**250**
Fuel Capacity, gals.	**350**
Endurance, hrs.	**8**
Range, miles (at 250 mph. no reserve)	**2,000**
Wing Area, sq. ft.	**300**
Power Loading, lbs. per hp.	**9.4**
Wing Loading, lbs. per sq. ft.	**32**
Minimum Single Engine Control Spd., mph.	**90**
Best SE Climb Speed, mph.	**110**
Ceiling, ft.	**24,000**
SE Ceiling, ft.	**14,000**
Take-off Distance Over 50 ft. Obstacle, ft.	**1,700**
Landing Distance Over 50 ft. Obstacle, ft.	**1,800**

By TOM McCLURE

EDITOR'S NOTE: The author is a business pilot, ex-airline captain and factory test pilot who flies a variety of twin-engine aircraft in his business travels. His analysis is based on 10,000 hrs. of flying experience. As an engineer, he knows his suggestions will not meet everybody's approval but we asked him to offer them as one man's provocative views. His reply follows:

IN a conversation on a recent flight in a new light twin with one of the Editors, I was reminded of the paradox that faces the corporate owner and pilot today — the spectre of famine in the midst of feast. Wherever you look, our airways and airports are active with privately-owned Douglas DC-3's and Beech 18 Twins, yet nowhere in this multitude of airplanes does one see any sign of a modern ship capable of replacing either. They are both undoubtedly design classics, but the industry possesses the know-how to produce very superior replacements for both types.

When you examine business flying operations, you are struck by the fact that the average daily load of the DC-3 is surprisingly low, and most model 18's carry five persons or less. From this you could speculate that an aircraft capable of efficiently shouldering such loads over greater distances, at higher speeds and lower costs, would meet the needs of many corporate aircraft operators. From a personal standpoint, the answer would appear to be an airplane grossing 9,500-10,000 lbs., having a pressurized cabin seating a total of six persons in comfort, and capable of 250 mph. at 15,000 feet, using economical cruise power, for an absolute duration of at least eight hours. The speed, duration, and the ability to fly at altitude are very directly related to the geographic and meteorological characteristics of the North American and Caribbean areas in which I currently do most of my flying. Any substantial minus deviation from these numbers would produce an aircraft which was unsatisfactory. Of course, the $64,000 question is where can we obtain such an airplane.

Tooling and engineering investment seems to be the root of the trouble. Yet, viewed objectively, manufacturers seem unwilling to take the normal commercial risks which, by the way, are a part of the everyday existence of practically all other businesses. Since no "letters to the editor" are able to change this situation, our only hope seems to lie in encouraging the further development of an existing model, thus minimizing costs for new tooling and engineering. This developmental, or evolutionary, technique has been followed with considerable success by Douglas in the DC-4/DC-7 routine.

Examining the candidates for development, we have the Beech 18, the Twin-Bonanza, and the Aero Commander 680. The genuinely new and original Cessna 620 four-engine project has great virtue, but the feeling is that it will cost very close to $400,000 per copy and it falls short of the specifications outlined earlier. A modern aircraft for $150,000 per copy, or less, is what I have in mind. The Beech Super 18 cabin is a very practical layout, and undoubtedly engineers armed with plenty of money could come up with a very respectable modern machine based on this fuselage, but the prospects for hitting our price bracket seem pretty remote. The Beech Twin-Bonanza might conceivably be "stretched" with supercharged engines, for example, but the possibilities of pressurizing its configuration (so much window area) are not encouraging. This leads us to what seems to be the most practical choice for the job, namely, the Aero Commander, as a subject for an evolutionary design. Since I have already specified passenger load, cruise speed, and duration, the next step would be to develop the desired changes with emphasis on wing loading, powerplants, fuel capacity and fuselage size.

Many pilots underestimate wing loading and its effect on structural loads, efficiencies and speed, comfort,

America's FORCE FOR PEACE

Teamwork and coordination are the keynotes of SAC, its officers and men of every rank—from airmen to commanding Generals. Pilots, co-pilots, observers, crew chiefs . . . technicians, mechanics . . . clerks, administrators, supply men . . . all are carefully chosen, highly trained specialists whose pride in their Command welds them into a tremendous force for peace. They are masters of their jobs. SAC has won the international respect of military experts for its handling of complex global operations under a single highly developed central control.

Curtiss-Wright joins all America in saluting the Strategic Air Command on its Tenth Anniversary as guardian of America and of world freedom.

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CORPORATION • WOOD-RIDGE, N. J.

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These Authorized Stations Feature Flat-Rate Service

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Denver, Colorado

Cruse Aviation, Inc.
International Airport
and Clover Field Airport
Houston, Texas

Dal-Tex Aviation, Inc.
Highland Park Airport and Love Field
Dallas, Texas

Dixie Air Associates, Inc.
Municipal Airport
Memphis, Tennessee

Executive Aircraft Company
Municipal Airport
Kansas City, Missouri

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Howard Aero, Inc.
Service Division
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Poelman Aircraft Co.
New Orleans Airport
New Orleans, Louisiana

Ragsdale Flying Service
Municipal Airport
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3 Big Reasons

Why Authorized Cessna Service is Best!

The facts, gained from many years of experience, prove that your Cessna is good for efficient, dependable performance over hundreds of hours of utilization per year.

Assure yourself of complete Cessna reliability and satisfaction by insisting on Authorized Cessna Service — our factory-approved facilities know your Cessna best and our factory-trained staffs specialize in factory methods, equipment and accessories.

Get the most out of your Cessna by taking advantage of the three big service features guaranteed by our factory-supervised Cessna Flat-Rate Program.

1 **You get an accurately quoted price and time-required quotation based on hundreds of job studies covering virtually all maintenance needs.**

2 **You get genuine Cessna parts and factory-trained workmanship.**

3 **You save money and time and we stand behind every job for your fullest satisfaction.**

AUTOMOBILE DEALER: Jim Cashman, a General Motors dealer in Las Vegas says, "I couldn't get along without my Cessna 310. It makes possible a lot of business travel which I couldn't undertake any other way. I call it my magic carpet because that's what it really is to me and my business."

OILMAN: John Myers, former Lockheed engineering test pilot, says, "I wanted a comparison so I flew the Cessna 310 and others before I made up my mind. The 310 is extremely efficient, easy to handle. Its good power loading gives excellent acceleration, gets me into and out of short fields, easily."

CONTRACTOR: Rupert Chisholm's business interests are spread from Southern California to Alaska. Mr. Chisholm covers this territory in his own Cessna 310. "The more I fly it, the more I like it," says Chisholm. "The 310 is faster. Handles easy, too. I looked over a lot of airplanes before I bought my Cessna 310."

They own and fly "Tomorrow's Twin" today!

THE BRILLIANT CESSNA 310

AT LEAST 5 YEARS AHEAD IN DESIGN, ENGINEERING ...PROVED BY MILLIONS OF MILES OF SAFE FLYING!

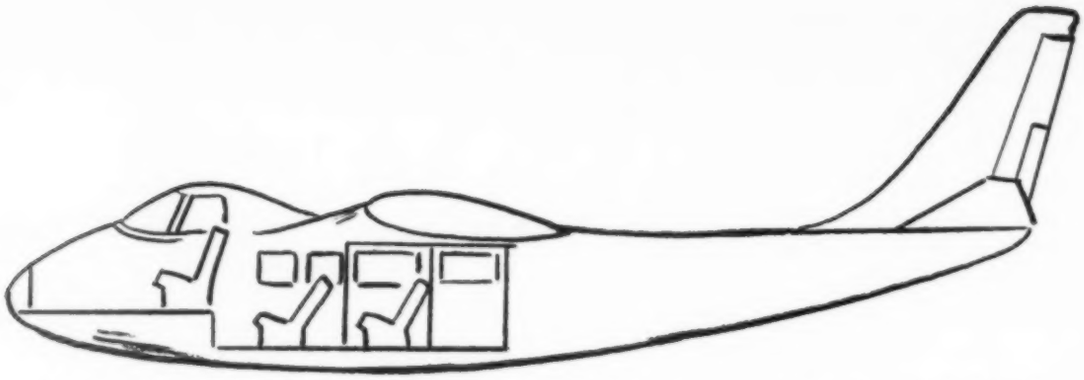
If you want the latest in twin-engine efficiency, safety features—be sure to see the Cessna 310. Hundreds of businessmen-pilots, like the ones above, are flying their own Cessna 310's. A completely new basic design, years ahead of others.

It looks and is smart and fast. Safety wing-tip tanks allow more lift with less wing. Big jet tail gives low-speed stability. Streamlined engine nacelles cut drag, add lift. Split flaps reduce landing speed. New "Hush-Flight" engine suspension, new extra-thick front windows and double rear windows. But more important—over three hundred satisfied 310 owners will tell you that it's also far ahead in ease-of-flying and safety features. Why buy less than the most advanced design—the most advanced engineering? Only $54,950 f.o.b. Wichita. See your Cessna dealer (Yellow Pages of phone book) or write CESSNA AIRCRAFT CO., DEPT. FM-7, Wichita, Kansas.

Cessna

Inquire about Cessna Lease Plans

5 GREAT CESSNAS 170 172 180 182 310 **THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED**



Here's a sketch showing lengthened fuselage and cabin, elevated cockpit, radar nose compartment and large baggage compartment behind main door. Wing is raised.

and landing area requirements. Increased efficiency requirements have caused wing loadings to go up in transports and business aircraft — and rightfully so. It does not seem to me that we have approached the limit of reasonable compromise in business types. The higher values help with air loads and they substantially increase efficiency and comfort in rough air. Coupled with adequate power loadings, they do not seriously limit airport selection.

Ideally, no multi-engine aircraft should fly before it has reached critical engine-out control speed (V-1). But, offhand, I can think of only one multi-engine aircraft that meets this requirement. Then there should be a reasonable gap between V-1 and V-2 (best one-engine-out climb speed), or the pilot will find himself tempted to hover on the hair-edge of directional control while trying to get over the trees at the end of the field. With low power loadings to enable the pilot to accelerate rapidly from V-1 to V-2, and by careful attention to adequate tail design and wing loading, the optimum can be approached.

If we retain the present Aero Commander wing, we come up with wing loadings of 32 lbs. This means we have a wing whose behavior we can forecast, and the only engineering requirement is for the increase in metal gauges to meet the structural requirements in going from 7,000 to 9,600 lbs. gross weight. I would estimate an empty weight increase of approximately 300 lbs. for this change.

Power plant selection is our next step. The logical engine appears to be a Lycoming GSO-720, rated at 510 hp. for take-off. Two of these engines, in full trim, weigh only 360 lbs. more than the 340-hp. GSO-480's now in the 680 Commander. The 720's are fuel-injection models and offer very impressive specifics at the power settings for the cruise performance we expect from our desired airplane. They develop the same horsepower per cubic inch as the 480's and introduce no increased complexity over current engines. Their reliability should prove of high order.

From a space standpoint, a true "wet" wing is certainly most efficient, but I would prefer a wing with separate nylon bladder cells. We will need a minimum of 350 gals. of fuel for the eight hours duration we have specified. Technically, I would prefer to avoid tip tanks if at all possible, and one fairly recent practice on larger aircraft which we would have to copy is the use of nacelle "saddle" tanks. Raising the height of the nacelle with respect to the wing actually offers some aerodynamic improvement, and we can tailor our saddle tanks to accept a rather impressive amount of fuel. The balance of capacity would require extending the nylon cell installation to the extreme wing tips. This would distribute the fuel weight throughout the wing and achieves significant stress relief in flight. True, there will be increased stress at the time of landing with full tanks, but modern design practice can adequately cope with these loads without extreme weight penalties — as witness what has been done with the Cessna 310, which carries all of its fuel in tip tanks. Alternatively, we could specify a lower landing than take-off weight, as is done in many transport airplanes and as has been proposed for the Cessna 620. This would call for small Fibreglas tip pods containing fuel dumping valves and Fibreglas chutes. Without fuel dumping, I feel our fuel capacity would cost us an empty weight increase of 250 lbs.

Several considerations govern our selection of fuselage size. Our most obvious requirement is room for four men to conduct a discussion, day or night, without interfering with the crew, and also to play bridge or some other form of cards — very popular diversion with our personnel. One thing is certain, however, if we are to obtain high performance at reasonable cost we will have to keep our airframe density high and, as we stated at the outset, we are interested in developing something from existing tooling. While I feel we need to increase the fuselage size of the 680, I hope it would be possible to spread it vertically with existing tooling. Also, lengthening a constant cross-section fuselage, such as the 680, is relatively simple to accomplish from a tooling standpoint.

My thought is to ask for a 6 in. increase in cabin height and an increase in cabin length of at least 12 inches forward of the wing. Since the new engines are 8 inches longer, this means that the plane of the propellers is moved 8 inches forward. Thus we can utilize this space for more room for the occupants of the middle row of seats. The balance I would use for a bulkhead separating the pilots from the passenger cabin. Fortunately, we also find a nice cabin space increase bonus in the Aero Commander if we raise the high wing to a point above the fuselage. A glance at a picture of the R3Y1 or the Fokker F-27 will give you an idea of what I mean. This calls for increased landing gear length and other alterations, but the experts tell us there is no serious loss in aerodynamic efficiency. This would give us straight-through headroom even though we would have somewhat restrictive fuselage frames at the point of the wing spars. Here we gain an opportunity for fitting a lavatory, a walk-in baggage compartment, and clothes-hanging space in the Commander fuselage — a nice arrangement from the standpoint of passengers. It eliminates walking through the lavatory area upon entering or leaving the cabin.

Our more powerful engines will require some increase in vertical tail arm, and I believe that this would not involve more than 12 in. of increased fuselage length aft of the wing. This

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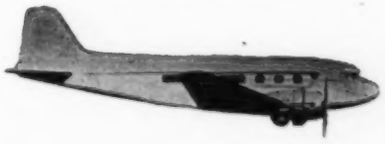

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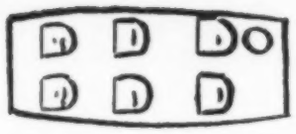
brings our total "stretch" to a maximum of 24 in., which should cost us an increase in empty weight of 500 lbs. From a structural standpoint, we are talking about pressurization differential of a maximum of 2 lbs., possible 2.2 lbs. This does not require tremendous beef-up of the existing cabin structure.

One of the real problems flying in and out of active areas today is that of near misses and lack of absolute visibility. Of course, the term "absolute" is relative, and we are never going to achieve such a condition short of the millennium. However, as a step in the right direction, I would like to raise the pilot's cabin area about 15 in. to 18 in. from its present position. This would produce a cockpit roof line somewhat similar to the Dove, or the R3Y1. The visibility from such a location would greatly enhance the pilots' ability to see other aircraft and take avoiding action in time. If the height adjustment is adequate, it might also provide space for someone to stand between the pilots for that leg stretching we all need on long flights. The space underneath the pilots' seats makes an excellent location for radio placement.

Another 200 lbs. should be allocated for increases in the weights of wheels, tires, brakes, and gear to handle the 9,600 lbs. gross. All in all, our figures add up to a new empty weight of 5,940 lbs. So we come up with a useful load of 3,660 lbs. for a 9,600 lbs. gross. We would dispose of this useful load somewhat as follows:

350 gals. fuel	2,100 lbs.
14.5 gals. oil	110 lbs.
6 people	1,020 lbs.
Radio and radar	190 lbs.
Baggage	240 lbs.
Total	3,660 lbs.

You might wish to challenge the baggage and radio-radar allowances. However, as you can see, the baggage allowance is consistent with the airline figure, and the configuration of the airplane makes it easy to carry additional baggage or cargo in lieu of passengers not carried. Here again our high density factor enters the picture. We can't have people carrying the kitchen sink around and at the same time keep our costs down. As for the low weight of the radio and radar, I would simply remind you that the greatest opportunity for modernization and improvement is in the area of systems, accessories, and electronics. The era of transistors is actually upon us, and many items are in the prototype and development stage — some even flying — which will support these numbers. The following figures are the result of actual personal observations of the equipment or, in some instances, discussions with senior engineers in our line of business, who are willing to support the values given.



Floor plan sketch shows small lavatory in baggage compartment. Bulkhead doorways, not shown, separate baggage compartment and cockpit from cabin.

Dual ADF	46 lbs.
Dual glide slope	8 lbs.
Dual omni localizer	30 lbs.
Transceiver (178 channels, 10-watt transmitter)	15 lbs.
Dual marker beacon	4 lbs.
Standby transmitter (44-channel, 4-watt)	8 lbs.
Distance measuring equipment	22 lbs.
X-band radar, 10-in. dish	57 lbs.
Total weight installed	190 lbs.

This equipment could be available at the weights indicated by the time our aircraft would be ready to use them — which means a year to a year-and-a-half if we were to start now.

There are pilots who debate the virtues of pressurization versus radar. In this model, however, we are able to carry both. The pressurization need not be an item of great expense, either originally or for maintenance, provided the practical approach is used in the design. We need an absolute minimum of complexity, and I would prefer a pair of Stratos Heli-Rotor pumps mounted directly to a special AN accessory section for the Lycoming GSO-720. The engine's present accessory case does not have the required drive pad, unless you are willing to forego one accessory. But the design and fabrication of an appropriate case presents no serious technical problem. Since the Heli-Rotor pumps are not centrifugal units, they can be throttled or controlled without concern for surge. Because we would drive them directly, we have avoided any additions or complications to the hydraulic system. The throttling valve has very light loading and can be motor actuated from a very small motor receiving its information from the cabin pressure control system. The Heli-Rotor pumps should weigh about 11 lbs. each for this installation, and we would require one boot-strap air cycling turbine for cooling our pressurized air. I would think this unit would weigh about 15 lbs. We also require gauges to show cabin altitude, absolute pressure difference, cabin vertical speed, and cabin-in air temperature. These are all standard items and can be obtained very reasonably.

Power brakes and power nose wheel steering are not, in my opinion, needed for aircraft in the weight category I am talking about, and I firmly believe in minimizing hydraulic devices and hydraulic fluid in small aircraft. One simplifying approach is to use hydraulics only for the landing gear and to operate the flaps with an electric screw jack similar to the system employed in the Douglas A-26.

Since a healthy skepticism plays a great part in the daily lives of aviation people, there may be those who will object to the numbers I have quoted. Personally, I believe they stand up pretty well when compared to other aircraft. The aircraft is heavier in empty weight to gross weight ratio than many current models, which is a fair indicator. Its principal virtues would be in using wing and power loadings to good advantage. Structural economies inherent in the increased wing loading and high density of the airframe make the numbers reasonable of achievement.

Business planes with 300-400-500-mph. performance, and with sea level cabin pressure at 20,000 ft. cruising altitudes, are going to be wonderful — if and when they ever become available. But what I'm concerned with is a business plane which can be made available within the near future combining reasonable and practical performance and pressurization at a cost of about $150,000 or less. ★ ★ ★

YOUNGEST INSTRUMENT PILOT is probably 17-year-old Gary Wright, shown above receiving his instrument rating from L. J. Mercure, CAA, while his dad, Delta Air Lines Captain K. D. Wright of Atlanta, looks on. Gary soloed on his 16th birthday. He earned paper-route money for an interest in his father's Luscombe. Gary hopes for a commercial license on his 18th birthday.
(Delta Air Lines Photo.)

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(Continued from page 23)

plex lows, severe fronts, heavy icing and thunderstorms.

Perhaps some conclusions I have drawn will be useful to others interested in safe operations while obtaining more utilization from their equipment. The emphasis here will be on the final conclusion, which makes excellent maintenance—the very best you can locate and depend on—the key to all successful situations.

1. Know your equipment and its capabilities under varying load conditions.

2. Do not accept anything but unrestricted clearances in the winter to an on-top operation. Traffic congestion plus chances of icing will not work. This goes for let-downs, too.

3. Watch your payload versus rate of climb versus tops. We always cancel under rime possibilities if we are above one-half gross payload and the tops are higher than 6,000 ft. A rapid rate of climb is essential and must be available.

4. Analyze turbulence. Ask questions. A little walk over to the airline captain on the ramp saves a lot of worrying later.

5. Never use your brakes while taxiing in snow, or you'll wind up with a pair of frozen wheels and your destination might be free of snow on the runways.

6. Upon failure to establish communications, turn your airplane 90 degrees and see what results you get. Accurate knowledge of your transmitter's capabilities is important.

7. Keep an alternate airport handy, and I mean handy. Alternate means one that fits into the picture as a definite good-weather proposition—strictly VFR with an upward trend.

8. Consider night operation a limited calculated risk and keep it at a minimum. .

9. Change your gyros every 300 hours and your electric turn and bank every 500 hours. Never, I repeat never, try to economize or save an instrument for an emergency (like a turn and bank) by keeping it turned off. Keep everything running—all the time—and this includes your radio gear, too.

10. Have a permanent oxygen system installed. It will come in handy, particularly for topping those low pressure troughs around 13,000 to 15,000 ft. in the winter.

11. Don't sit on the ground for 30 or 40 mins. waiting for a clearance with your engine running. An engine is not meant to run on the ground, period. Tell the tower to give you a green light when your clearance comes through and then fire up again.

12. Prop wash is deadly dangerous and I can't stress enough the necessity for staying out of it. Watch the ground temperatures and absence of wind on those hot, sultry, muggy days. Under those conditions, prop wash hangs around a long time.

13. Radio suggestions: Get in the habit of tuning to departure control on VFR days, approach control and towers to obtain a line on traffic in and out of the airport you are coming into. Also, get large-scale maps of busy terminal areas, such as New York, Cleveland, Chicago, Detroit, Washington and others you frequent, and spend half an hour in each of the respective towers plotting local check points used by the tower operators. For example, in the Cleveland area, become familiar with Terminal Tower, TV Alley, Searstown, Loraine Avenue, Rocky River, Crile Clinic, General Motors and the like.

14. Know your minimums. Going out of an airport with conditions so low you can't get back in again is

The Nesmith Cougar

THERE are numerous private experimental lightplane projects around the country and one of them is now being test-flown in Houston. It is the Nesmith Cougar, shown in the pictures between the engines of an executive DC-3 parked at Andrau Airpark in Houston.

Bob Wolfe of Andrau Airpark, who furnished the photos, said the Cougar was designed and built by Robert Nesmith, a Houston contractor and Andrau customer, and that plans will be available for the cost of blueprinting.

He describes the fabric-covered Cougar as having a span of 20-ft. 2 ins., 19-ft. length and 5-ft. height at the 2-pl. cabin, which is as wide as that of a 180. Gross weight is about 1,200 lbs. and empty weight is about 600 lbs. according to Wolfe. It uses a 108-hp. Lycoming engine and was designed for speeds in the neighborhood of 180 mph. Landing speed is about 50 mph. and slightly less with flaps.

Note the clean, tubular-steel torsion-bar landing gear struts and low-drag windshield.

foolish and inviting trouble in case of an emergency.

15. After obtaining an instrument rating and equipping your aircraft for its use, fly instruments mentally and actually on all VFR trips, day after day. Work constantly in good weather and memorize terminal procedures. Memorize your mileages, check points, frequencies. Call the terminal area centers on good days, from far and near, in every quadrant, to learn all about your transmitter's capabilities. Practice, practice, practice. Memorize the locations of all the fields on your most traveled routes.

16. Thunderstorms—stay out of.

17. Fuel reserves. Nobody ever has enough gas, so always play it accordingly. I always plan at least 2 hours of reserve fuel on arrival at my destination if on an on-top clearance. This may be overly cautious, but I sure have peace of mind knowing I can go back 300 miles if I have to.

18. Restricted visibility in metropolitan areas: As far as I am concerned, when visibility gets down below 4 or 5 miles in a metropolitan area, I am in favor of controlled flight. That's when control is needed—for funneling the traffic down a slot. I certainly do not want two-way traffic on a one-way thoroughfare. It is a jolt, to put it mildly, to come up on Flatbush Marker in New York on an IFR clearance with visibility 1 mile or so (LaGuardia reporting 3 miles in smoke) and have a Connie slide in on your blind side unannounced. There's no comfort in knowing the Connie captain is technically correct with 1 mile, but then visibility drops to one-half or less across Brooklyn or in similar areas. Give me control in cases like that.

19. The key to everything, it must be stressed, is superb maintenance. If you want dependable transportation out of your airplane, seek and accept nothing less than outstanding work done by the very best people you can locate—people with the most experience and best reputation. My work is done by Derion Aviation in Erie. Earl Derion has done work for me for the last 20 years. It is a tribute to him and his genuine interest and ability when I say that I have yet to cancel a flight for mechanical reasons. ★ ★ ★

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Engine-Out Reminders for Pilots of Light Twins

By FRED K. DICK

REPORTS of recent one-engine-out accidents in light twin-engine aircraft emphasize that twin-engine safety can be fatally misleading.

Pilots should study the flight operations manual of their airplane and determine engine-out-best-climb-speed, remembering also the airplane's limitations such as gross weight allowable and performance under conditions of altitude, temperature, turbulence, precipitation, etc.

In the following, we refer to the most critical parts of single-engine flying — engine trouble during take-off and climb-out; at 1,000 ft. or less above obstructions; at high altitude cruise above high terrain (close to single-engine ceiling of your airplane).

Pilots should practice one-engine-out flying and maneuvering with one engine idling until they are sure they have sufficient practice and are thoroughly familiar with the airplane.

Then they should practice feathering and maneuvering under safe conditions of at least 4,000 to 3,000 ft. above a good-size airport with radio tuned to tower frequency if there is a tower.

Of prime importance is an air speed indicator located on the instrument panel for easy glancing, which does not take too much attention from the NATURAL horizon and obstructions outside the airplane.

To be ready for engine-out emergencies, you should be:

1. A pilot who has practiced AIR SPEED CONTROL at single-engine climb speed to plus 5 mph.

2. A pilot who knows from experience the control forces of unbalanced power at this speed (one engine full power).

3. A pilot who knows the DIRECTION and number of turns on the trim tabs necessary for one engine on full power, and the direction and number of turns back toward neutral for power-off landing.

In short, a pilot who also knows the limitations of his plane and his accessories will be prepared for the critical single-engine emergency if and when it comes.

A twin-engine plane's gross weight is the greatest weight at which that airplane is licensed to operate — but it is also the highest weight at which the single-engine performance figures are any good.

It is surprising how few OVERLOAD POUNDS critically affect a twin's ability to fly on one engine. If you really add it up — the extra equipment, the gasoline, the baggage and the passengers — you quickly realize how easy it is to overload and thereby sacrifice your single-engine safety.

Above sea level, the un-supercharged twin's take-off and climb performance falls off rapidly with altitude. At 4,000 ft., for example, a supercharged (10 to 1 blower) Pratt & Whitney Junior 985 engine is slightly under full take-off horsepower.

At altitude, use the biggest and longest airports available, remembering that UNDERLOADING can well be necessary for safety.

OUTSIDE AIR TEMPERATURE: At take-off above 59 degrees F., performance falls as temperature increases.

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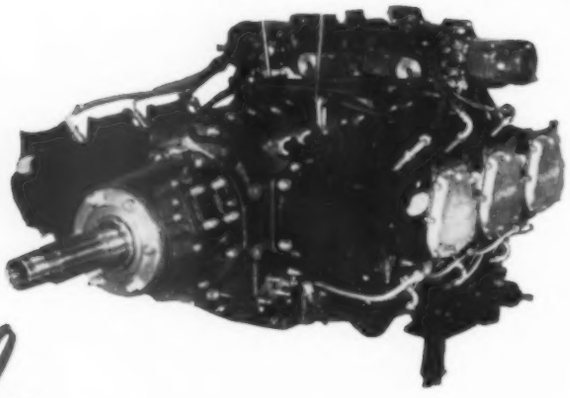

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It is surprising to experience the difference in performance on a 90-deg. or 100-deg. day in an emergency.

ENGINE OIL TEMPERATURE: For propellers using engine oil for feathering, warm engine oil is necessary for satisfactory propeller feathering (and also for propeller governing). Warm oil should be in the oil lines to the governor and in the propeller dome before take-off. In the Aero Commander flight operations manual, for example, engine run-up procedure is emphasized to make certain the pilot gets warm oil to the propeller domes, as follows: "1. Advance the throttles to 1,500 rpm. after temperatures are in the green. 2. Move prop controls to full feathering position (note rpm. drop to 700-800 rpm.). Move controls to full forward position. (Note: For cold engines, repeat three or four times; for warm engines, once.) 3. Check mags, etc."

Propellers which have not had occasional operation to full feathering position possibly will not fully feather when needed but will only windmill slowly — because of oil sludge accumulation and lack of full-travel wiping action in propeller domes. Frequent exercising of the full-feather controls will help prevent this. A WINDMILLING PROPELLER CRITICALLY AFFECTS SINGLE-ENGINE PERFORMANCE.

TURBULENCE: An airplane rated at 300-feet-per-minute climb on one engine at gross weight is rated in smooth air — it will surprise you to experience how long it seems to take to gain 1,000 ft. in bumpy air.

PRECIPITATION: Moderate rain accumulation on an airplane increases the gross weight of the airplane. Precipitation necessitates the use of carburetor heat on some engines and the use of carburetor heat decreases engine horsepower (it further decreases horsepower by loss of ram).

In an engine-out emergency, the following are of great importance:

FIRST: Indicated air speed is the No. 1 crutch for the pilot's action or reaction to an engine malfunction and what procedure he decides to put into effect.

SECOND: Climb, go-around or even continued level flight is impossible with gear extended in many twin-engine airplanes — the gear must be retracted and the plane cleaned up immediately if flight is to be continued.

For further engine-out emergency material, write to the Department of Commerce, Civil Aeronautics Administration, Washington 25, D. C., for Aviation Safety Release Number 400, "Flight Emergencies in Light Twin-Engine Planes." ★ ★ ★

MORRISEY NIFTY

(Continued from page 30)

Empty Wt., lbs.	875	850
Span, ft.	30	30
Length, ft.	20	20
Height, ft.	7	7
Tread, ins.	82	82

"I believe the Nifty has all the things it takes not only for simple, enjoyable flight instruction but to retain the student's interest after he learns to fly so that he will continue flying," Morrisey says. "It is useful in personal flying and business flying. It is comfortable, economical, fast, easy and safe to handle on the ground and in the air, rugged, designed for simplicity in construction and maintenance and has the looks to attract more people to flying."

Morrisey says studies he has made with competent authorities convince him the Nifty can be produced in limited quantities in the $5,800 category. He realizes this is far above the current prices for used trainer-type lightplanes but believes the Nifty's modern features and performance make enough difference to justify production.

"If enough operators who fly the Nifty while I'm on my trip indicate

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there is a need for it, I'll take steps to produce it right away," Morrisey said in Dallas. "So far, the reception has been excellent and I'm hoping for the best." Morrisey's address is Morrisey Aviation, Inc., Orange County Airport, Santa Ana, California. ★ ★ ★

MOONEY'S IN BUSINESS

(Continued from page 25)

of Midland, Texas. With two hectic years of complete reorganization and perfection of the now CAA-approved design behind them, the two partners look with conservative optimism to the full production stage of operation and development of the market.

"We have tried to become as self-sufficient as possible," Hoffman told us during the tour of the factory. About the only outside sources they are using are for heat treating, drop hammer and stretch-press work. Eventually they plan to install these facilities if volume and price are affected. Total manufacturing floor space now in use is 30,000 square feet.

Perhaps the most efficient manufacturing process we observed was in wing fabrication, largely due to Mooney's long experience in bonded plywood construction techniques that make possible the slick laminar-flow wing on the M-20.

The middle of April marked the red letter day of accomplishment, according to Hoffman. That was when the first "bug-free" production model rolled out the door for delivery. One by one, the deficiencies of the original prototype and first few units have been met and whipped. Noise, ventilation, cowl flaps, engine cooling, snug-fitting doors, wheel well covers and finally carburetion, just to mention the major ones, have all been perfected.

"If anyone mentions augmenter tubes," Hoffman asserts, "I think I'll shoot 'em!" After much costly experimentation they have finally eliminated the tubes and have now produced a better exhaust system with considerably less noise. Only those who have launched a new model lightplane can appreciate the thousand and one little things that have to be corrected before the perfect-as-possible production model finally rolls off the line. Mooney believes they have reached that point as of now.

That's why they point with pride to their CAA production certificate, which arrived in April coincident with the final engineering changes that might well make the Mark-20 a welcome competitor in the lightplane market and the Mooney Company a major contributor to modern business air transportation through engineering progress and development. ★ ★ ★

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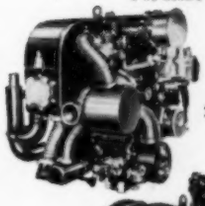
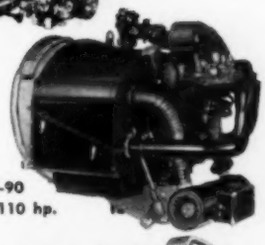
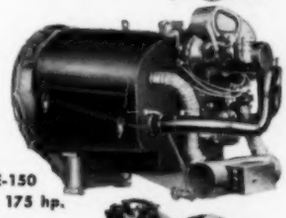


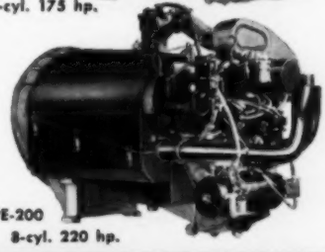
PC-30
2-cyl. 34 hp.



PE-90
4-cyl. 110 hp.



PE-150
6-cyl. 175 hp.



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Sinclair Air Fleet Finishes Year of DME Operations

THE Sinclair Oil Corporation and its subsidiaries have completed a full year of DME (distance measuring equipment) operations in their multi-engine, all-weather fleet of aircraft.

As a matter of company policy, all 10 twin-engine planes in the Sinclair fleet are fitted with the most advanced equipment for navigation and communications. Since early 1955, all have been equipped with Narco distance measuring equipment.

Two of the Sinclair planes — a Lockheed Lodestar and a Twin Beech D-18S — are based at the oil company's Tulsa headquarters. Three more — a Lockheed Ventura, Douglas DC-3, and D-18S — are based at Westchester County Airport, White Plains, N. Y. One Lodestar and a de Havilland Dove are at Independence, Kansas; another Lodestar is at Chicago; one D-18S is at Fort Worth and another at Houston. The Sinclair planes operate throughout the United States, Canada and Mexico and average in the neighborhood of 600 hours per year per airplane.

Installation of DME in the Sinclair fleet was initiated by Henry W. Boggess, Sinclair's director of Aviation, and Chief Pilot Dave Peterson. Joe Lacey, Sinclair's pilot supervisor based at Westchester County Airport, sums up better than 12 months' experience in using DME for cross-country navigation and approaches in high-density traffic areas in this fashion:

"As a general aid to navigation ease, DME is the last word — there's just nothing better. And under instrument conditions, the very worst weather we fly in, DME gives us something we have always needed and never before had. It tells us continuously and unmistakably exactly where we are.

"In IFR flight we are always going down a line of omni stations, but until we had DME we didn't know exactly where we were most of the time — we could only estimate. With DME we know where we are for sure. Naturally we like the equipment very much.

"Airways Traffic Control still has a lot to learn about DME and its uses, but we talk it up continually and try to insist on DME approaches. Now we're beginning to see a good deal of improvement in ATC utilization of DME. Just to cite one example, DME does away with the need for cross-omni checks in reporting positions, and ATC personnel who understand DME now realize this. On approaches, DME will eventually take the place of markers on the final approach and has already proved itself infinitely better than markers in every respect.

"It is our good fortune at Sinclair that we have never had an emergency where we had to make spectacular use of DME to get us down safely in a hurry. Routine, everyday use of the equipment, under VFR as well as night and IFR conditions, has convinced us that it is an essential item in any well-equipped plane."

Lacey concludes: "It's still too soon to appreciate the full value of DME. Many more pilots must become fully familiar with its advantages, and happily more and more pilots are now learning what DME can do for them. ATC must adjust to thinking in terms of DME, and the occasional difficulties with ground transmitters must be overcome. (These, incidentally, are far less troublesome than the difficulties we experienced with omni stations in the early stages.) When fully understood and utilized, DME, which is already of great value, will be worth its weight in uranium in any cockpit."

Boggess' view on DME were set forth by him in a report to the Air Force Association's Jet Age Conference in February. In his capacity as president of the National Business Aircraft Association, he said:

"Today's air traffic demands that each IFR aircraft has a positive fix in airspace.

"VOR/DME can give it, and all aircraft entering high-density traffic areas under IFR conditions should have the equipment aboard.

BEFORE

AFTER

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Questions and Answers for Operators

T-Hangars and Fire Safety

QUESTION: We have about completed a number of T-hangars on our municipal airport here. As airport manager, I have a question. These hangars, which are owned by the city, will be leased to individuals. I have had experience with larger hangars. One question arises regarding the operation of T-hangars on which I need some help.

Monthly inspections are conducted of all buildings on the airport for the purpose of fire protection and the avoidance of any fire hazards. However, since T-hangars will be rented to individuals and will be locked by those individuals, I would like to know how you would recommend that we exercise the same precautions and protection for such hangars as we do the large hangars. It seems to us that we owe the same careful supervision of the premises to the renters of such hangars as we do to the tenants and owners who store in the larger hangars. Since structures are in banks, one careless tenant could be the cause of damage to others in the same bank.

ANSWER: Your inquiry is a particularly pertinent one since a good many cities are providing T-hangars either for direct rental to owners or through operators who sub-lease to owners.

A question of fire protection and prevention in any structure on an airport is one that you cannot afford to overlook. We are sure that no occupant of a large hangar or a T-hangar desires conditions which might lead to a fire. However, inspection is the only sure method of preventing thoughtless exposure of inflammable materials, oil soaked rags, uncovered dope and paint receptacles. In many instances a fire hazard exists not because of carelessness but due to the fact that many of the dangerous sources of fire are not understood.

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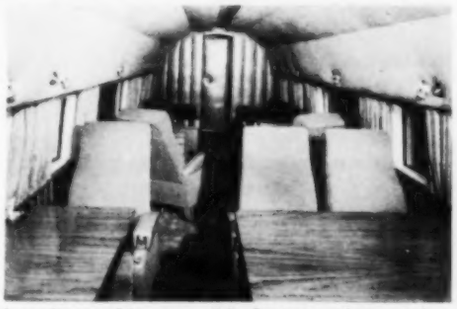

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we ran into Ed Colby, director of airports for the city of Lubbock, Texas. Ed has a habit of thinking things through to a conclusion and we asked him how he handled your problem in the T-units he has on Lubbock Municipal Airport. Here is the gist of it: The city furnishes all locks for the individual T-hangars. These are master locks of the same brand and the master key is kept on the fire truck. No two locks are alike, but the master key will fit all of them.

Once a month the fire chief at the airport, in company with the city fire marshal, makes an inspection of all the buildings on the airport, including the T-hangars. This inspection is not made on the same day each month.

When any condition is found which might be considered as critical the tenant of the T-hangar is notified and given a period of time in which to correct the condition. On the date that period expires the hangar is reinspected.

In order that all those who use the T-hangars may be familiar with the need for care two signs are placed in each T-hangar. One of these is worded to the effect that the storage of gasoline or other inflammable materials is prohibited. The second requires that doors be kept closed except when moving aircraft.

We asked him if it was against the rules to store one's car in the hangar and he said that was customary when the aircraft was taken out.

The value of having master lock with the master key on the fire truc and with a register of all the ke numbers in the airport office is un deniably good. In the event of smok or other indication of fire in an indi vidual hangar, the fire chief havin the master key on the fire truck ca readily get in without breaking dow a door. If an owner loses his key th master key can be used to give him access to his hangar and the registe of key numbers makes it readily possible to replace the key.

The prevention of fire is a full-time job on any major installation. It is an especially good practice to seek the advice and services of the city fire marshal on inspections and on the formulation of rules and regulations with respect to the prevention of fire hazards. In fact, organization does not stop with equipment, training, personnel and preventive rules and regulations.

Well-organized fire protection recognizes the need for keeping fire lanes clear, for developing the quickest possible routes of access from the fire station to various structures and areas of the airport, provision for calling additional equipment from the nearest off-airport fire stations and a well ordered control of people who are attracted by fires. Since airports are subject both to aircraft and structure fires, planning for both types is essential.

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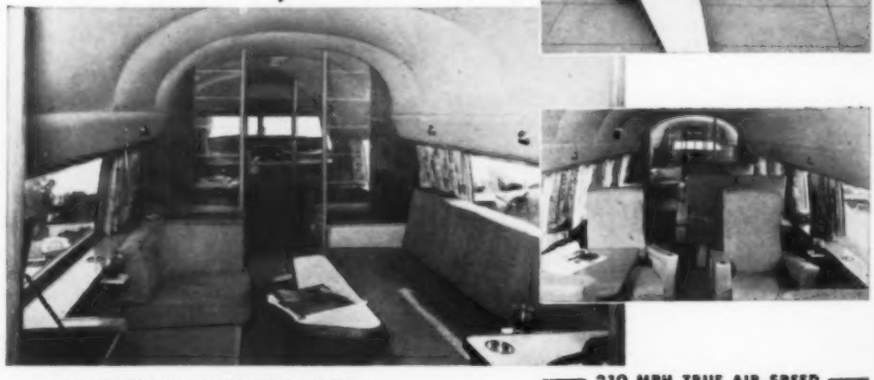

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PHOENIX TOWER is this unique tubular structure, located on the ramp side of the terminal building at Sky Harbor. Picture also shows some of the beautiful shrubbery and palm trees which also make the Sky Harbor terminal distinctive.
—(Phoenix Chamber of Commerce Photo.)

Help from Readers Asked

Not long ago an inquiry came to us based on a somewhat different concept of an airport board or commission in that an attempt was being made to set up such a board or commission with the individual members selected by vote of the community. We had never heard of this type of board and we wonder if there is any precedent for it.

If any reader knows of a board which is formed of elective members we would like to have the details.

At first thought it would appear that such a means of selection might not result in the same grade of selection as an appointive method. On the other hand, we wonder whether nominees will be easy to find since jobs of this sort usually are without compensation and require a lot of work.

Frankly we don't know the answer. But we hope some of the readers do.

The other day we spent an hour or so on an airport and the operator showed us a new lease he had just made on terms he believed to be very advantageous. He was correct, we believe, in his judgment of the terms, but in reading the lease we noted one other thing that wasn't to his advantage. There was no clear description of what his lease covered. It is not a function of this column to comment on legal matters but one of the faults to be found with many leases is lack of clear and definite description of property leased.

We recall having a survey made of one of the major airline airports 15 years ago and among the oddities found by the surveying crew was the fact that a fixed-base operator's hangar put up with his own money was partially on the land he had leased for that purpose and partially on land for which he did not have a lease. The fault in that particular case was that there had never been a satisfactory survey of any of the airport property prior to the time the lease was made.

Even a lease or rental of a structure, it would appear to us, should clearly state what adjacent areas, if any, are usable by the lessee in connection with his tenancy.

GOLD MEDALS FOR OUTSTANDING CONTRIBUTIONS TO PUBLIC SERVICE, THE NATION OR HUMANITY have gone to 8 CAA employes from the Department of Commerce. They are Blanche Noyes, for air marking; Peter Caporale, for electronics applications to air transportation; Holmes A. Bucher, Raymond L. Creel, Jr., James H. Mason, Norvell W. Wright, James I. Bruce and John J. Masiello, for heroic action in rescuing. All but Bruce and Masiello reside in the Washington, D. C., area.

EDGAR B. FRANKLIN, former chief of the CAA Air Carrier Safety Division in Washington, has succeeded Enar Olson, resigned, as deputy regional administrator at Honolulu for the CAA.

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*The name *Vertol* is a contraction of the words VERtical Take Off and Landing.

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From the moment the *spirit of '76* was born with the *shot heard 'round the world* and proclaimed with the ringing of the Liberty Bell . . . sounds have played a vital part in our American freedom!

Today, the freedom of every man, woman and child of this nation is inseparably linked with another sound – the protective roar of great new jet aircraft like Convair's delta-wing supersonic F-102A all-weather Interceptor.

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Ruth Law, the fifth woman to hold a pilot's license, learned to fly in 1912. She soon proved she could fly as well as most men; indeed, she competed with men in the aerial contests of the time.

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In 1916, Ruth Law flew non-stop from Chicago to Hornell, New York—a distance of 512 miles, to establish a new world's record. She accomplished this in a pusher plane, and her flight was a truly great achievement at that time. From Hornell, she continued on to Binghamton and New York City, for a total distance of 884 miles in less than nine hours.

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Phillips Petroleum Company has long performed as a pioneer in petroleum research for the development of more powerful, more efficient aviation fuels. For example, Phillips was first to manufacture Di-isopropyl and HF Alkylate, two aviation fuel components of vital importance to modern high-speed, high-power performance.

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